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## What's Wrong With American Secondary Schools: Can State and Federal Governments Fix it?

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## What's Wrong With American Secondary Schools: Can State and Federal Governments Fix it?

### Abstract

[Excerpt] The poor performance of American students is sometimes blamed on the nation's "diversity". Many affluent parents apparently believe that their children are doing acceptably by international standards. This is not the case. In Stevenson, Lee and Stigler's (1986) study of 5th grade math achievement, the best of the 20 classrooms sampled in Minneapolis was outstripped by every single classroom studied in Sendai, Japan and by 19 of the 20 classrooms studied in Taipeh, Taiwan. The nation's top high school students rank far behind much less elite samples of students in other countries. In mathematics the gap between Japanese and Finnish high school seniors and their white American counterparts is about twice the size of the two to three grade level equivalent gap between blacks and whites in the US (NAEP 1988b; IAEEA 1987). The learning deficit is pervasive.

### Keywords

CAHRS, ILR, center, human resource, job, worker, advanced, labor, wage, wage rate, secondary education, role, state government, American, student, performance, employment, school, role, employ, vocational, education, United States, youth, risk, work, job, training, occupation, college, examination, school, student, learning, economic

### Comments

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**WHAT'S WRONG WITH  
AMERICAN SECONDARY SCHOOLS:  
CAN STATE AND FEDERAL GOVERNMENTS  
FIX IT?**

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Working Paper # 90-17

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## **WHATS WRONG WITH AMERICAN SECONDARY SCHOOLS ? CAN STATE AND FEDERAL GOVERNMENTS FIX IT ?**

Ninety-three percent of 17 year olds do not have "the capacity to apply mathematical operations in a variety of problem settings."  
(National Assessment of Educational Progress, 1988b p. 42)

Twenty-five percent of the Canadian 18 year olds studying chemistry know as much chemistry as the top 1 % of American high school graduates taking their second year of chemistry, most of whom are in Advanced Placement classes (International Association for the Evaluation of Educational Achievement, 1988).

In October of 1985, 1986, 1987 and 1988, 28 percent of the previous June's noncollege-bound white high school graduates had no job. Fifty-five percent of the black graduates had no job (Bureau of Labor Statistics 1989).

The high school graduates of 1980 knew about 1.25 grade level equivalents less math, science, history and English than the graduates of 1967. This decline in the academic achievement lowered the nation's productivity by \$86 billion in 1987 and will lower it by more than \$200 billion annually in the year 2010 (Bishop 1989).

Between 1971 and 1988 real wages fell 17.3 percent for young male high school graduates and 10 percent for young female graduates. (Katz and Murphy 1990)

The poor performance of American students is sometimes blamed on the nation's "diversity". Many affluent parents apparently believe that their children are doing acceptably by international standards. This is not the case. In Stevenson, Lee and Stigler's (1986) study of 5th grade math achievement, the best of the 20 classrooms sampled in Minneapolis was outstripped by every single classroom studied in Sendai, Japan and by 19 of the 20 classrooms studied in Taipeh, Taiwan. The nation's top high school students rank far behind much less elite samples of students in other countries. In mathematics the gap between Japanese and Finnish high school seniors and their white American counterparts is about twice the size of the two to three grade level equivalent gap between blacks and whites in the US (NAEP 1988b; IAEEA 1987). The learning deficit is pervasive.

## **I. LOW EFFORT: THE PROXIMATE CAUSE OF THE LEARNING DEFICIT**

This poor record of achievement is caused by the limited amount of time, money and, above all, psychic energy devoted to academic learning in American high schools. Students, parents and the public are all responsible.

### **Student Effort**

Learning is not a passive act; it requires the time and active involvement of the learner. In a classroom with 1 teacher and 18 students, there are 18 learning hours spent to every 1 hour of teaching time. Student time is, therefore, the critical resource, and how intensely that time is used affects learning significantly.

Studies of time allocation using the reliable time diary method have found that the average number of hours per week in school is 25.2 hours for primary school pupils, 28.7 hours for junior high students and 26.2 hours for senior high students. The comparable numbers for Japan are 38.2 hours for primary school, 46.6 hours for junior high school and 41.5 hours for senior high school (Juster and Stafford 1990). In addition, school years are longer in both Japan and Europe.

Studies show that American students actively engage in a learning activity for only about half the time they are scheduled to be in school. A study of schools in Chicago found that public schools with high-achieving students averaged about 75 percent of class time for actual instruction; for schools with low achieving students, the average was 51 percent of class time (Frederick, 1977). American students average nearly 20 absences a year; Japanese students only 3 a year (Berlin and Sum 1988). Overall, Frederick, Walberg and Rasher (1979) estimated 46.5 percent of the potential learning time is lost due to absence, lateness, and inattention.

In the High School and Beyond Survey students reported spending an average of 3.5 hours per week on homework (National Opinion Research Corporation 1982). **Time diaries yield similar estimates: 3.2 hours for junior high school and 3.8 hours for senior high school. Time diaries for Japanese students reveal that they spend 16.2 hours per week studying in junior high school and 19 hours a week studying in senior high school.** With the sole exception of Sweden, students in other countries report spending a good deal more time on homework than Americans (Robitaille and Garden 1989). When homework is added to engaged time at school, the total time devoted to study, instruction, and practice in the US is only 18-20 hours per week -- between 15 and 20 % of the student's waking hours during

Table 1  
Time Use By Students

	<u>T.V.</u>		<u>Reading Time</u>
	Students	All Adults	Students
U.S.	19.6	15.9	1.4
Austria	6.3	10.6	4.9
Canada	10.9	13.3	1.5
Finland	9.0	9.0	6.0
Netherlands	10.6	13.4	4.3
Norway	5.9	7.2	4.3
Switzerland	7.7	9.0	4.8

Source: Organization of Economic Cooperation and development Living Conditions in OECD Countries Tables 17.2, 18.1, 18.3 & 18.4.

the school year. By way of comparison, the typical senior spent nearly 10 hours per week in a part-time job (NORC 1983) and 19.6 hours per week watching television. Thus, TV occupies as much time as learning. In table 1 we can see that secondary school students in other industrialized nations watch much less television: 55 percent less in Finland, 70 percent less in Norway and 44 percent less in Canada (Organization of Economic Cooperation and Development, Table 18.1, 1986). In other countries high school students watch less TV than adults; in the United States they watch more. Reading takes up 6 hours of a Finnish student's non school time per week, 4.8 hours of Swiss and Austrian students time but only 1.4 hours of an American students time.

Science and mathematics deficits are particularly severe because most students do not take rigorous college preparatory courses in these subjects. The high school graduating class of 1982 took an average of only .43 credits of Algebra II, .31 credits of more advanced mathematics courses, .40 credits of chemistry and .19 credits of physics (Meyer 1988 Table A.2).

Even more important than the time devoted to learning is the intensity of the student's involvement in the process. At the completion of his study of American high schools, TheodoreSizer (1984) characterized students as, "**All too often docile, compliant, and without initiative.**(p. 54)" John Goodlad (1983) described: "**a general picture of**

**considerable passivity among students...**(p. 113)". The high school teachers surveyed by Goodlad ranked "lack of student interest" as the most important problem in education.

The student's lack of interest makes it difficult for teachers to be demanding. Sizer's description of Ms. Shiffe's biology class, illustrates what sometimes happens:

She wanted the students to know these names. They did not want to know them and were not going to learn them. Apparently no outside threat--flunking, for example--affected the students. Shiffe did her thing, the students chattered on, even in the presence of a visitor....Their common front of uninterest probably made examinations moot. Shiffe could not flunk them all, and, if their performance was uniformly shoddy, she would have to pass them all. Her desperation was as obvious as the students cruelty toward her."(1984 p. 157-158)

Some teachers are able to overcome the obstacles and induce their students to undertake tough learning tasks. But for most, the student's lassitude is demoralizing. Teachers are assigned responsibility for setting high standards but we do not give them any of the tools that might be effective for inducing student observance of the academic goals of the classroom. They finally must rely on the force of their own personalities. All too often teachers compromise academic demands because the bulk of the class sees no need to accept them as reasonable and legitimate.

Nevertheless, American students do not appear to realize how poor their performance is. **Even though American 13 year olds were one-fourth as likely as Korean students to "understand measurement and geometry concepts and [to be able to] solve more complex problems," Americans were three times more likely to agree with the statement, "I am good at mathematics"** (Lapointe, Mead and Phillips 1989).

Proposed reforms of secondary education include stricter graduation requirements, more homework, increases in the amount and difficulty of course material, greater emphasis on the basics (English, math, science, social science, computer science), and improvements in the quality of teaching through higher salaries, career ladders, and competency tests for teachers. Although desirable, these reforms are limited in that they emphasize changes in the content and quality of what is offered by schools and require the student to work harder. These reforms have ignored the problem of **motivating** students to take rigorous courses and to study harder. New York State, for example, tried to increase the rigor of high school curricula by upgrading the requirements for the Regents diploma, but the result has been a substantial drop

in the numbers of students getting the Regents diploma and an increase in the number of students receiving local diplomas.

### **Parental Effort**

The second major reason for the low levels of achievement by American students is parental apathy. High school teachers rank "lack of parental interest" as the second most important problem in education (Goodlad 1983). An NSF funded survey of 2222 parents of 10th graders found that 25 percent thought their child should take only 1 or 2 science classes in high school (LSAY, Q. BH165). When 2829 high school sophmores were asked whether "My parents...think that math (science) is a very important subject," 40 percent said no with respect to mathematics and 57 percent said no with respect to science (LSAY, Q. AA19Q-AA19R). Only 30 percent of 10th graders reported their parents "want me to learn about computers" (LSAY, Q AA19D).

**Despite the poor performance of Minneapolis 5th graders in mathematics, their mothers were much more pleased with the performance of their local schools than the Taiwanese and Japanese mothers.** When asked "How good a job would you say \_\_\_'s school is doing this year educating\_\_\_", 91 percent of American mothers responded "excellent" or "good" while only 42 percent of Taiwanese and 39 percent of Japanese parents were this positive (Stevenson, Lee and Stigler 1986). Table 2 presents data from this study

Table 2  
**Learning Is A Low Priority Of Parents**

	Minneapolis	Sendai Japan	Taipeh Taiwan
Mothers Attended College	58%	22%	13%
5th Grader Has Study Desk	63%	98%	95%
Parents Purchased Workbook For Additional Homework			
Mathematics	28%	58%	56%
Science	1%	29%	51%
5th Grader Assigned Chores	95%	76%	28%
Parents Believing Their School is Doing an "Excellent or Good Job"	91%	39%	42%

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Stevenson, Lee & Stigler "Mathematics Achievement of Chinese, Japanese and American Children," Science, February 1986.



Despite the small size of Japanese and Taiwanese homes, 95-98 percent of the fifth graders in these two countries had a desk of their own specifically for studying, while only 63 percent of the Minneapolis children had a desk. Mathematics workbooks had been purchased for their children by 56-58 percent of Taiwanese and Japanese parents but by only 28 percent of American parents. Science workbooks had been purchased by 51 percent of Taiwanese parents, 29 percent of Japanese parents, and by only 1 percent of American parents (Stevenson, Lee and Stigler 1986). This is not because they love their children any less, they have different priorities such as teaching responsibility and work habits by requiring that they do chores around the house. Clearly, American parents hold their children and their schools to lower academic standards than Japanese and Taiwanese parents.

If American parents were truly dissatisfied with the academic standards of their local public schools, they would send their children to private schools offering an enriched and rigorous curriculum as many parents do in Australia, and tutoring after school would be as common as it is in Japan. Japanese families allocate 10 percent of the family's after-tax income to educational expenses; American families only 2 percent. Most parents who send their children to private day schools appear to be attracted by their stricter discipline and religious education, not by more rigorous academics and better qualified teachers. At the great majority of private day schools, students do not learn at an appreciably faster rate than public school students (Cain and Goldberger 1983).

#### **Public Effort: Educational Expenditure--a Deceptive Indicator**

The ratio of per pupil expenditure in kindergarden through 12th grade to per capita GNP is lower in the United States than in 10 of 11 other advanced Western nations (Mishel and Rasell 1990). This statistic suggests that elementary education receives lower priority in the US than other nations. People who disagree with this implication point to another statistic, per pupil expenditure deflated by a cost of living index on which the United States ranks 2nd among the same group of 12 nations (US Department of Education 1990). This 2nd form of comparison is not very useful, however, because the costs of recruiting competent teachers are much higher in the US than abroad. Labor compensation accounts for 90 percent of education costs and, clearly, the wage that must be paid to recruit qualified teachers is substantially higher in countries with higher standards of living. A wage index for other college graduates in the society would probably be a reasonable proxy for this cost but such data is not

generally available. Deflation by GNP per worker or per capita GNP is the next best thing and comes substantially closer to the ideal than deflation by the cost of living. The result, however, is by no means a perfect index.

Even with the correct deflator, expenditure per pupil remains a deceptive indicator of a nation's investment in education because different countries budget school costs differently and assign public schools different functions. Mishel and Rasell's study included the costs of preschool education in their expenditure figure. Preschool education is funded through public education budgets in many European countries but not in the United States. This inflates European expenditure per pupil figures relative to those in the US. On the other hand, costs of transportation are generally not included in school budgets in Japan and Europe where students, even 1st graders, use the public transportation system to go to school. In many European countries after-school sports are sponsored and organized by local government, not the school. This removes the capital costs of extensive school-based sports facilities and the salaries of coaches and maintenance personnel from the school budget.

Vocational education is more expensive than traditional academic courses. The fact that the United States, Sweden, and France have their schools provide occupational training to large numbers of 16-18 year olds raises costs per student relative to the costs in Germany, Switzerland and Austria where employers are responsible for most of these costs. In 1980, German employers invested an average of \$6000 per year in the training of each apprentice they took on as part of the dual system of vocational training (Noll et al. 1984). American schools perform functions such as after school sports, after school day care, hot lunches, and driver education that other countries often assign to other institutions. When data are carefully adjusted for all of these factors and deflated by a cost of education index reflecting compensation levels in alternative college level occupations, American spending per pupil is likely to be lower than in many European nations.

The primary reason for low real expenditure on education in the United States is the low levels of teacher compensation. When college graduate earnings are compared, education majors come out at the very bottom. In 1967 males with an undergraduate degree in engineering earned 67 percent more and those with a bachelors degree in business administration earned 36 percent more than males with education degrees.<sup>1</sup> Despite recent increases in teacher salaries the gap between teachers and other college graduates has grown even larger. Data on relative salaries is presented in the first column of Table 3. In 1984,

TABLE 3

## Relative Salaries by College Major

	US Adults 1984	US Prev. Yr. Grads. 1985	1979	1989
Education	100	100	100	100
Humanities	106	101	86	92
Physical Science	205	127	97	102
Engineering	228	175	102	110
Economics	224	---	91	100
Business (BA)	216	136	---	---
(MBA)	317	---	---	---

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Source: Census, Current Population Report, CPR, P70, No. 13;  
Digest of Educ. Statistics 1987; Graduate Careers Council  
of Australia, "Graduate Starting Salaries 1989."

physical science majors earned 105 percent more, engineers earned 128 percent more, economics majors 124 percent more and business majors 116 percent more than education majors. Social science majors earned 35 percent more and liberal arts, humanities and English majors earned 6-8 percent more than education majors. An MBA was worth 88 percent more, a Masters in Engineering 70 percent more and a law degree 114 percent more than a Masters or PhD in Education.<sup>2</sup> It is not an immutable law of nature that teachers should be paid substantially less than other occupations. Australian university graduates with education degrees start at the same salary as graduates in economics/business, 8 percent ahead of those who majored in humanities and only 2 percent below those who majored in physical science. Graduating engineers are paid only 10 percent more than education majors in Australia; they are paid 75 percent more in the US (Guthrie 1990). No wonder it is so difficult to attract the best and brightest into the teaching profession. The SAT test scores of entering freshman expressing an interest in majoring in education are lower than for any other major. No wonder it is particularly difficult to recruit science and mathematics teachers.

Comparisons with other industrialized societies tell the same story. Since many countries fund pensions and medical insurance through mandated social security taxes, it is essential to include both voluntary and compulsory contributions for these purposes in the calculation of teacher compensation. Estimates of total compensation per teacher deflated for cost of living differences between countries are presented in the first column of Table 4. In 1982-84, total compensation was 24 percent higher in Canada and Sweden, 6-7 percent higher in Germany and Holland, 20 percent higher in Belgium and 28 percent higher in France than in the United States.<sup>3</sup> Despite lower overall standards of living, these six countries paid their teachers more than we did. Compensation was 37 percent lower in the United Kingdom, 40 percent lower in Italy and 26 percent lower in Japan. Relative to output per hour worked, however, Japan paid its teachers 25 percent more than we did. The relative compensation of teachers was thus lower in only two countries, Britain and Italy.

The question that tends to be raised by statistics such as these is "Why do American voters choose to pay teachers so little?" Why do voters not demand higher standards of academic achievement at local high schools? Why do school boards allocate scarce education dollars to interscholastic athletics and the band rather than better mathematics teachers and science laboratories? It is to questions such as these that we now turn.

Table 4  
Relative Teacher Compensation

	Teacher Compensation* 1982-84	GDP Per Hour Worked** 1977-81	Ratio Teacher Index/ GDP/hr
U.S.	100	100	1.0
Belgium	120	94	1.28
Canada	124	88	1.41
France	128	95	1.35
Germany	107	95	1.13
Italy	60	68	.88
Japan	74	59	1.25
Netherlands	106	97	1.09
Sweden	124	79	1.57
United Kingdom	63	78	.81

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\* Total compensation including compulsory health & pension contributions deflated by cost of living. (Index with US = 100) Source UNESCO.

\*\* Total domestic output divided by total hours worked deflated by cost of living. (Index with US = 100) Source Angus Maddison.

### **Voter Apathy Regarding Academic Achievement**

One of the unique characteristics of the American education system is that all the really important decisions--budget allocations, hiring selections, salary levels, homework assignments, teaching strategies, grading standards, course offerings, pupil assignments to courses and programs, disciplinary policies, etc.--are made by classroom teachers and school administrators who are responding to local political pressures. Federal and state officials are far removed from the classroom, and the instruments available to them for inducing improvements in quality and standards are limited. They do not have effective control of the standards and expectations that prevail in the classroom. They do not control the allocation of school funds between academics and athletics.

State aid can be increased; but econometric studies suggest that increases in state aid reduce local property tax collections by a significant amount (Carroll 1982; Ehrenberg and Chaykowski 1988). Only about 50 cents of every dollar of non-categorical state aid to local school districts appears to be spent on education. For categorical programs like Title I, the increase in local education spending is larger, but some leakage appears to be inevitable (Tsang and Levin 1983; Monk 1990).

School boards are the primary mechanism by which the voters exercise authority over local schools. In most parts of the country only bond issues need go to the voters for approval. The board determines the budget and sets the property tax rates necessary to fund that budget. Parents are typically a minority of voting age adults in the community, but only about 10 percent of the non-parents in a community typically vote in school board elections. Parents are more likely to vote in school board elections, so they have effective control of the school board in many communities. In all other communities, they could easily gain control the board if they voted in concert. Parents pay less than a third of school taxes in most communities, so voting for school board members who promise to support increased educational spending and higher standards is, for them, a low cost way of improving the school attended by their child. Why hasn't this potential power been exercised to raise academic standards and teacher salaries? Why are less than a third of parents voting in most school board elections? Why do so many parents vote against increases in school taxes? When additional money is available, why is so much of it spent on upgrading the sports program, band and vocational education?

If, as indicated above, the parents of a community are satisfied with academic outcomes which leave their children years behind students of other nations in mathematics and science, federal and state efforts to raise standards will have no lasting effect.

## **II. THE ABSENCE OF REWARDS FOR EXCELLENCE: THE ROOT CAUSE OF THE LEARNING DEFICIT**

**The fundamental cause of the low effort level of American students, parents, and voters in school elections is the absence of good signals of effort and learning in high school and a consequent lack of rewards for effort and learning.** In the United States the only signals of learning that generate substantial rewards are diplomas and years of schooling. In all other advanced countries mastery of the curriculum taught in high school is assessed by essay examinations which are set and graded at the national or regional level. Grades on these exams signal the student's achievement to colleges and employers and influence the jobs that graduates get and the universities and programs to which they are admitted. How well the graduating seniors do on these exams influences the reputation of the school and in some countries the number of students applying for admission to the school. In the United States, by contrast, students take aptitude tests that are not intended to assess the learning that has occurred in most of the classes taken in high school. The primary signals of academic achievement are grades and rank in class--criteria which assess achievement relative to other students in the school or classroom, not relative to an external standard.

Consequently, the students who do not aspire to attend selective colleges benefit very little from working hard while in high school, and parents have little incentive to vote the tax increases necessary to upgrade the academic quality of local schools. This is a consequence of nine phenomena:

- 1. Because their student bodies are so diverse, American high schools offer an incredible variety of courses at vastly different levels of rigor. Most students choose courses that have the reputation of being fun and not requiring much work to get a good grade. The rigor of the courses taken is not efficiently signaled to colleges and employers, so taking rigorous courses is seldom rewarded. Teachers know this and adjust their style of teaching and their homework assignments with**

**an eye to maintaining enrollment levels. Course selection is subject to a Gresham's law in which easy electives drive out rigorous courses.**

- 2. The peer group actively discourages academic effort. No adolescent wants to be considered a "nerd, brain geek, grade grubber or brown noser," yet that is what happens to students who study hard and are seen to study hard. Peers have a personal interest in persuading each other not to study, because the school's signals of achievement assess performance relative to fellow students through grades and class rank not relative to an external standard.<sup>4</sup>**
- 3. Setting higher academic standards or hiring better teachers does not on average improve the signals of academic performance--rank in class, GPA and SAT scores--that selective colleges use for making admission decisions and a few employers use to make hiring decisions. Higher standards for graduating are not likely to be supported by the parents of children not planning to go to college, because they would put at risk what is most important, the diploma. Higher standards do not benefit students as a group, so parents as a group have little incentive to lobby strongly for higher teacher salaries, higher standards and higher school taxes.**
- 4. There is no effective way of holding most high school and middle school teachers individually accountable for the learning of their students. Unionization is not the critical barrier, for unionized European and Japanese secondary school teachers and most American primary school teachers feel accountable for the learning of their students. The lack of accountability in the US stems from: (1) the rarity of high stakes examinations assessing student achievement in particular subjects relative to an external standard, and (2) the fact that most secondary school students receive instruction in English, mathematics, history, and science from many different teachers. The exceptions to this norm are the coaches of the athletic teams, the band conductor, teachers of advanced placement classes, and vocational teachers (who are often evaluated for their success in placing students in good jobs). In Europe, students who are preparing to take a particular exam at the end of their secondary education typically remain together in one class and**



are taught by the same teacher in successive years. In Japanese junior high schools, a team of teachers, each responsible for a different subject, teach all the 7th graders one year, the 8th graders the next year, and the 9th graders the third year. Examinations taken during 9th grade determine admission to competitive high schools so teachers feel great pressure to assure that their students do well on these examinations.

5. In most American communities, students and parents cannot choose which local public high school to attend. In Europe and Japan, by contrast, the family can, within the constraints of competitive admissions policies, often select which secondary school a student attends. Barriers to attending a school other than the closest one are lower in these countries because public transportation is available, opportunities to participate in sports and music are often organized by the community not the school, and centralized funding of schools means that money follows the student even when a non-public school is selected. The centralization of funding and the free choice of schools results in stronger competitive pressure on schools to excel and smaller quality differentials between schools of the same type than in the US.
6. In most American communities, studying hard in primary school and middle school does not lead to opportunities to attend a better or more rigorous high school. In Japan and most European countries, by contrast, some upper secondary schools offer more rigorous educational programs than others and there is stiff competition for admission to many of these schools. The consequence of this system is that students put a good deal more effort into their studies in lower secondary school than in the United States.

#### **College Bound Students**

7. Most American colleges and universities do not set rigorous standards for admission. High school students know that taking undemanding high school courses and goofing off in these courses will not prevent them from going to college.

8. Where admission to college does depend on high school performance, it is not based on an absolute or external standard of achievement in high school subjects. Rather, it is based, in part, on aptitude tests which do not assess the high school curriculum, as well as on measures of student performance such as class rank and grade point averages, which are defined relative to classmates' performances.

#### Non-College Bound Students

9. The labor market fails to reward effort and achievement in high school. Analysis of the Youth Cohort of the National Longitudinal Survey indicates that during the first 10 years after leaving high school, greater competence in science, language arts and mathematical reasoning lowers wages and increases the unemployment of young men. For young women, verbal and scientific competencies have no effect on wage rates and a one grade level increase in mathematical reasoning competence raises wage rates by only one-half of one percent (Bishop 1988b). As a result, students who plan to look for a job immediately after high school see very little connection between how much they learn and their future success in the labor market. Less than a quarter of 10th graders believe that geometry, trigonometry, biology, chemistry, and physics are needed to qualify for their first choice occupation (LSAY, 1988, BA24B-BA25D).

Although the economic benefits of higher achievement to the employee are quite modest and do not appear until long after graduation, the benefits to the employer (and, therefore, to national production) are immediately realized in higher productivity. Over the last 80 years, industrial psychologists have conducted hundreds of studies, involving hundreds of thousands of workers, on the relationship between productivity in particular jobs and various predictors of that productivity. They have found that competence in reading, mathematics, science and problem solving are strongly related to productivity in almost all of the civilian and military jobs studied (Ghiselli 1973; Hunter, Crossen and Friedman 1985; Bishop 1989).

Despite their significantly higher productivity, young workers who have achieved in high school have not been receiving appreciably higher wage rates after high school.

Apparently, when a non-college-bound student works hard in school and improves his or her competence in language arts, science and mathematical reasoning, the youth's employer reaps much of the benefit.<sup>5</sup>

Employers believe that school performance is a good predictor of job performance. Studies of how employers rate job applicant resumes which contain information on grades in high school have found that employers give substantially higher ratings to job applicants with high grade point averages (Hollenbeck and Smith 1984). However, they have great difficulty getting information on school performance. If a student or graduate has given written permission for a transcript to be sent to an employer, the Federal Education Rights and Privacy Act obligates the school to respond. Many high schools are not, however, responding to such requests. In Columbus Ohio, for example, **Nationwide Insurance sent over 1,200 requests for transcripts signed by job applicants to high schools in 1982 and received only 93 responses.**

An additional barrier to the use of high school transcripts in selecting new employees is that when high schools do respond, it takes a great deal of time. In most high schools, the system for responding to transcript requests has been designed to meet the needs of college-bound students rather than the students who seek jobs immediately after graduating. The result is that a 1987 survey of a stratified random sample of small-and medium-sized employers who were members of the National Federation of Independent Business (NFIB) found that transcripts had been obtained prior to the selection decision for only 14.2% of the high school graduates hired.<sup>6</sup> Only 15% of the employers had asked high school graduates to report their grade point average. The absence of questions about grades on most job application forms reflects the low reliability of self reported data, the difficulties of verifying it, and the fear of EEO challenges to such questions.

Hiring on the basis of recommendations by high school teachers is also uncommon. In the NFIB survey, when a high school graduate was hired, the new hire had been referred or recommended by vocational teachers in only 5.2% of the cases and referred by someone else in the high school in only 2.7%. Tests are available for measuring competency in reading, writing, mathematics, science, and problem solving; but, after the 1971 Griggs decision, almost all firms were forced to stop employment testing by EEOC guidelines which made it prohibitively costly to demonstrate test validity.<sup>7</sup> The 1987 NFIB survey found that basic skills tests had been given in only 2.9 % of the hiring decisions studied. Other

countries handle the signaling of high school accomplishments to colleges and to prospective employers very differently.

### **Incentives to Learn in Other Nations**

The tendency not to reward effort and learning in high school appears to be a peculiarly American phenomenon. Marks in school are the major determinant of who gets the most preferred apprenticeships in Germany. In Canada, Australia, Japan, and Europe, educational systems administer achievement exams which are closely tied to the curriculum. While the Japanese use a multiple choice exam, all other nations use examinations in which students write essays and show their work for mathematics problems. Generally, regional or national boards set the exams and oversee the blind grading of the exams by committees of teachers. These are not minimum competency exams. In many subjects the student may choose to take the exams at two different levels of difficulty. Excellence is recognized as well as competence (Noah and Eckstein 1988).

Performance on these exams is the primary determinant of admission to a university and to particular fields of study such as medicine and law. Good grades on the toughest exams--physics, chemistry, advanced mathematics--carry particularly heavy weight. Exam grades are included in resumes and are asked for on job applications (see Exhibit 1 and 2).

In Japan, clerical, service, and blue collar jobs at the best firms are available only to those who are recommended by their high school. The most prestigious firms have long term arrangements with particular high schools to which they delegate the responsibility of selecting new hires for the firm. The criteria by which the high school is to make its selection are, by mutual agreement grades and exam results. In addition, most employers administer their own battery of selection tests prior to hiring. The number of graduates that a high school is able to place in this way depends on its reputation and the company's past experience with graduates from the school. Schools know that they must be forthright in their recommendations because if they fail just once to make an honest recommendation, the relationship will be lost and their students will no longer be able to get jobs at that firm (Rosenbaum and Kariya 1989).

This system has the consequences one might expect. Rosenbaum and Kariya's (1990) study of the high school to work transition in Japan finds that good grades, no discipline problems, and participation in extracurricular activities all have significant positive effects on

NAME:

ADDRESS:

Exhibit 1  
Resume of Irish  
Secondary School Graduate

DATE OF BIRTH:

AGE:

NATIONALITY:

TELEPHONE NO:

EDUCATIONAL DETAILS

Primary School

Post Primary

Secretarial Course

Office Procedures  
Course

EXAMINATIONS

Intermediate Certificate

1981

SUBJECTS

English B - L.C.  
Irish C - L.C.  
Maths B - L.C.  
Science C  
Geography C  
History C  
Home Economics D

Leaving Certificate

1982

SUBJECTS

English D - L.C.  
Irish C - L.C.  
Maths C - L.C.  
Biology C - H.C.  
Geography C - L.C.  
French D - L.C.  
Home Economics B - L.C.



APPLICATION FOR AN APPOINTMENT HANDLED BY MVP

16, Highfield Road, Edgbaston, Birmingham, B15 3DU Tel: 021 455 9765/0559

United Kingdom

33

Appointment applied for DISTRIBUTION PROJECTS MANAGER (B&Q) Ref.No. ....

PERSONAL DETAILS: (block capitals)

Surname JOHN Title MR Forenames MERVYN JOHN

Address 7, CARRMARSH GARDENS

Postal Code ... Tel.No.Home ... Work ...

Marital Status M Children/Dependants (with ages) 1 x 4 yrs, 1 x 1 yr

Age 33 Date of Birth 5.8.55 Nationality BRITISH Place of Birth ULFRACRESE, IRE

State of health OK Height 6' Weight 135 lb

Any disabilities/recurrent medical problems? None Regd.disabled ...

Driving Licences CAR Car Owner ✓ Company Car ...

Endorsements, convictions, accidents, etc. None

Leisure activities and offices held in clubs and societies CYCLING/WALKING

EDUCATION:

Secondary Education

From	To	School	Exams Taken (inc. grades)	Other achievements
1966	1972	BARISTAPLE GRAMMAR	'O' LEVEL:- ENG. LANG. (2), MATHS (1), PHYSICS (2), GEOGRAPHY (1), STATISTICS (3), CHEMISTRY (3), ADD. MATHS (6), HISTORY (6), AGRICULTURE (6) 'A' LEVEL:- CHEMISTRY (E), PHYSICS (E), MATHS (O)	MIDDLE SCHOOL CAPTAIN

Further Education

From	To	College/University	Course & results (inc. class/grades)	Other achievements
1972	1973	UNIVERSITY OF BRADFORD	APPLIED CHEMISTRY - LEFT AFTER 1 YEAR - DOMESTIC REASONS	

Other training and qualifications (inc. in-company and external courses, etc.)

From	To	Establishment	Training/Qualifications
1979		FAIRLEY COLLEGE, LEEDS	CERTIFICATE OF PROFESSIONAL COMPETENCE (TECHNICAL OPS)
1983	1984	BRADFORD COLLEGE	INSTITUTE OF INDUSTRIAL MANAGEMENT CERT.
1984	1989	IN-COMPANY	NUMEROUS MANAGEMENT COURSES.

Membership of professional bodies

obtaining jobs at large firms and entering a white collar occupation. In the US , by contrast, the job outcomes of males are not improved by good grades, few absences from school, a lack of discipline problems or participation in extracurricular activities. For female high school graduates, obtaining a white collar job is associated with high grades, but it is also positively associated with being a discipline problem in school.

Parents in Japan, Canada, Australia, and Europe know that a child's future depends critically on how much is learned in secondary school. In many countries the options for upper secondary schooling depend primarily on the child's performance in lower secondary school, not on where the parents can afford to live, as in the US. Since the quality and reputation of the high school is so important, the competitive pressure often reaches down into lower secondary school. National exams are the yardstick, so achievement tends to be measured relative to everyone else's in the nation and not just relative to the child's classmates. As a result, parents in most other Western nations demand more and get more from their local schools than we do and, nevertheless, they are more dissatisfied with their schools than American parents.

Japanese teenagers work extremely hard in high school, but once they enter college, many stop working. For students in non-technical fields a country club atmosphere prevails. The reason for the change in behavior is that when employers hire graduates with non-technical majors, they base their selections on the reputation of the university and a long series of interviews and not on teacher recommendations or other measures of academic achievement at the university. Students in engineering and other technical programs work much harder than their liberal arts counterparts largely because job opportunities depend entirely on the recommendation of their major professor. **Studying hard is not a national character trait; it is a response to the way Japanese society rewards academic achievement.**

American students, in contrast, work much harder in college than in high school. This change is due, in part, to the fact that academic achievement in college has important effects on labor market success. When higher level jobs requiring a bachelors or associates degree are being filled, employers pay more attention to grades and teacher recommendations than when they hire high school graduates. The NFIB survey found that when college graduates were hired, 26 percent of the employers had reviewed the college transcript before making the selection, 7.8 percent had obtained a recommendation from a major professor and

6.3 percent had obtained a recommendation from a professor outside of the graduate's major or from the college's placement office.

### **III. STATE POLICY RESPONSES**

The key to motivating students to learn is recognizing and rewarding learning effort and achievement. Some students are attracted to serious study of a subject by an intrinsic fascination with the subject. They must pay, however, a heavy price in the scorn of their peers and lost free time. Society offers them little reward for their effort. Most students are not motivated to study by a love of the subject. Sixty-two percent of 10th graders agree with the statement, "I don't like to do any more school work than I have to" (Longitudinal Survey of American Youth or LSAY, Q. AA37N). As a result, far too few high school students put serious time and energy into learning and society suffers.

If this situation is to be turned around, the peer pressure against studying must be greatly reduced and rewards for learning must be increased. The full diversity of types and levels of accomplishment need to be signaled so that everyone--no matter how advanced or far behind--faces a reward for greater time and energy devoted to learning. Learning accomplishments need to be described on an absolute scale so that improvements in the quality and rigor of the teaching and greater effort by all students in a school makes everybody better off. Colleges need to be induced to select students on the basis of externally validated achievements, not by "aptitude" test scores or rank in class.

Increasing numbers of employers need workers who are competent in mathematics, science, technology, and communication. If these employers know who is well educated in these fields, they will provide the rewards needed to motivate study. Ninety-two percent of 10th graders say they "often think about what type of job I will be doing after I finish school"(LSAY, Q. AA13C). If the labor market were to begin rewarding learning in school, high school students would respond by studying harder and local voters would be willing to pay higher taxes so as to have better local schools. The Secretary of Labor's Commission on Workforce Quality and Labor Market Efficiency advocates such a change:

The business community should...show through their hiring and promotion decisions that academic achievements will be rewarded (p. 9).  
High-school students who excel in science and mathematics should be rewarded with business internships or grants for further study (p. 11).

Some might respond to this strategy for achieving excellence by stating a preference for intrinsic over extrinsic motivation of learning. This, however, is a false dichotomy. Nowhere else in our society do we expect people to devote thousands of hours to a difficult task while receiving only intrinsic rewards. Public recognition of achievement and the symbolic and material rewards received by achievers are important generators of intrinsic motivation. They are, in fact, one of the central ways a culture symbolically transmits and promotes its values.<sup>8</sup>

Recommendations for policy initiatives by the state government have been grouped into four categories:

- \* Better signals of learning accomplishment,
- \* Inducing students to pursue a more rigorous curriculum,
- \* Creating new opportunities for learning in schools,
- \* Generating additional recognition and rewards for learning.

### **3.1 Better Signals of Learning Accomplishment**

Without a better system of signaling student accomplishments in high school to parents, colleges, employers, and the public, it is very unlikely that there will be sustained improvements in the academic achievement of American high school students. The National Commission on the Skills of the American Workforce (1990) recently provided a description of what a national system of performance measurement might look like:

#### **The Foundation Skills**

A new educational performance standard should be set for all students, to be met by age 16. This standard should be established nationally and benchmarked to the highest in the world.

All of our students should meet a national standard of educational excellence by age 16, or soon thereafter, which will equal or exceed the highest similar standard in the world for students of that age. A student passing a series of performance based assessments that incorporate the standard should be awarded a Certificate of Initial Mastery.

In order to adequately prepare our young people for working life, we must first see that they acquire the educational skills necessary to become effective players in a highly productive society. The establishment of a system of national standards and assessment would ensure that every student leaves compulsory



school with a demonstrated ability to read, write, compute and perform at world-class levels in general school subjects (mathematics, physical and natural sciences, technology, history, geography, politics, economics and English). Students should also have exhibited a capacity to learn, think, work effectively alone and in groups and solve problems. Among other things, the Certificate of Initial Mastery would certify labor market readiness, and a mastery of the basic skills necessary for high productivity employment. The same Certificate would also be required for entry into all subsequent forms of education, including college preparatory and certified professional and technical programs.

The assessment system would establish objective standards for students and educators, motivate students and give employers an objective means to assess the capabilities of job applicants. The Certificate of Initial Mastery would not indicate the completion of student's formal education. Rather, for the vast majority of students, this achievement would serve as a foundation for more advanced forms of education or training.

### **A Cumulative Assessment System**

The assessment system should allow students to collect credentials over a period of years, perhaps beginning as early as entrance into the middle school. This kind of cumulative assessment has several advantages over a single series of examinations:

- o It would help to organize and motivate students over an extended period of time. Rather than preparing for a far-off examination (the form and demands of which a 12-year-old can only dimly imagine), students could begin early to collect specific certifications.
- o It would provide multiple opportunities for success rather than a single high-stake moment of possible failure. Cumulating certificates would greatly enhance the opportunity for the undereducated and unmotivated to achieve high educational standards. All could earn credentials at their own pace, as the criteria for any specific credential would not vary, regardless of the student's age.
- o It would allow students who are not performing well in the mainstream education system to earn their credentials under other institutional auspices.

### **An Independent Examining Organization**

To set the assessment standards and certification procedures, we recommend the establishment of an independent national examining organization that broadly represents educators, employers and the citizenry at large. The organization should be authorized to convene working commissions in a variety of knowledge and skill areas to help train judges, set and assess standards and conduct

examinations. The organization should be independent of schools and school systems and protected from political pressures (p 69-70).

### Instituting Statewide Achievement Examinations

Until a national system of performance assessment is established, states should implement such systems on their own. Statewide tests of competency and knowledge that are keyed to the courses students are taking (e.g. New York State's Regents Examinations and California's Golden State Examinations) should be made a graduation requirement. Students should have to complete a series of these exams before being awarded grants or subsidized loans and before being admitted to public colleges. Results on these exams should replace SAT and ACT test scores in the admission and selection process and determine the award of state merit based scholarships. Students should be given a credential certifying performance on these exams and employers should be encouraged to factor examination results into their hiring decisions.

An exam system such as this maximizes incentives to study. All employers would have access to information on the academic achievements of job candidates, not just the employers who choose to give employment tests. The connection between effort in school, performance on the exams and job placement would become clearly visible to all.

This approach to signaling academic achievement has a number of advantages. By retaining control of exam content, educators and the public influence the kinds of academic achievement that are rewarded by the labor market. Societal decisions regarding the curriculum (e.g. all students should read Shakespeare's plays and understand the Constitution) tend to be reinforced by employer hiring decisions. Tests developed solely for employee selection purposes would probably place less emphasis on Shakespeare and the Constitution. Because it is centralized and students take the exam only once or twice, job applicants do not have to take a different exam at each firm they apply to, and the quality and comprehensiveness of the test can be much greater. There is no need for multiple versions of the same test and it is much easier to keep the test secure.

Shifting emphasis away from teacher assessment to external assessment also has important pedagogical benefits. It transforms the relationship between teachers and students into a more cooperative one in which they work jointly to prepare the students for the external assessment.

### Develop Better Assessment Mechanisms

As student recognition and rewards come increasingly to depend on the results of school assessments of competency, it becomes more and more important that we improve methods of assessing academic achievement. Linking assessment to curriculum also implies a need for a greater diversity of assessment mechanisms. However, the need for multiple versions of the assessment instrument and for fairness to minorities make test development very expensive. The federal government should underwrite state consortia and other organizations that seek to develop alternatives to currently available tests and assessment mechanisms. Priority needs to go to developing methods of assessing higher order thinking skills and hands on performance through simulations, portfolios of the student's work, and demonstrations of skills conducted in front of judges. High cost has been the primary barrier to the use of these richer forms of assessment. Consequently, consideration should be given to subsidizing these more costly assessment mechanisms.

### Induce either a complete transformation of SAT and ACT Tests or a substitution of Advanced Placement and national or state sponsored achievement exams for purposes of awarding state scholarships and selection for competitive colleges

While national examinations are necessary, the Scholastic Aptitude Test (SAT) is not the kind of test that is helpful. The SAT suffers from two very serious limitations: the limited range of the achievements that are evaluated and its multiple choice format. The test was designed to be curriculum free. To the extent that it evaluates the students' understanding of material taught in schools, the material it covers is vocabulary and mathematics. Most of the college preparatory subjects studied in high school--science, social studies, technology, art, music, computers, trigonometry and statistics--are completely absent from the test. As a result, it fails to generate incentives to take the more demanding courses or to study hard. The newly revised SAT is not a major improvement over the old test. The new version of the ACT test is a definite improvement for it tests science and social science knowledge and attempts to measure problem solving in science. Both tests suffer from the common problems that arise from their multiple choice format. National and provincial exams in Europe are predominantly essay and extended answer examinations. The absence of essays on the SAT and ACT tests contributes to the poor writing skills of American students. The tests advertise themselves as an ability test but is in fact an achievement test measuring a very limited range of achievements (Jencks and Crouse 1982). Jencks and Crouse have recommended that either

the SAT evaluate a much broader range of achievements or be dropped in favor of Advanced Placement examinations. Knowledge and understanding of literature, history, technology, science, and higher order thinking skills should all be assessed. These exams should not be limited to a multiple choice format and essays should be required where appropriate. Foreign language exams, for example, should test conversational skills as well as reading and writing. Students taking science courses should be expected to conduct experiments and demonstrate the use of lab equipment.

It is not clear if there is a federal role in engineering necessary changes in the selection methods of colleges and universities. Major revisions of tests like the SAT and ACT are quite expensive. Possibly the federal government could induce the testing organizations to undertake the effort by offering to subsidize development costs.

#### Certifying Competencies and Releasing Student Records

Schools should develop easily understood transcripts which at the request of students, are readily available to employers. These transcripts should contain documentable measures of achievement in a variety of fields as well as attendance records. State governments should provide assistance to facilitate the standardization of transcripts so that they will be more easily understood. (Secretary of Labor's Commission on Workforce Quality, p. 12)

Schools should provide graduates with certificates or diplomas that certify the students' knowledge and competencies, rather than just their attendance. Competency should be defined by an absolute standard in the way Scout merit badges are. Different types and levels of competency need to be certified. Minimum competency tests for receiving a high school diploma do not satisfy the need for better signals of achievement in high school. Some students arrive in high school so far behind, and the consequences of not getting a diploma are so severe, we have not been willing to set the minimum competency standard very high. Once they satisfy the minimum, many students stop putting effort into their academic courses. What is needed is a more informative credential which signals the full range of student achievements (e.g. statewide achievement exam scores, competency check lists).

One of the saddest consequences of the lack of signals of achievement in high school is that employers with good jobs offering training and job security are unwilling to take the risk of hiring a recent high school graduate. They prefer to hire workers with many years of

work experience. One important reason for this policy is that the applicant's work record serves as a signal of competence and reliability that helps the employer identify who is most qualified. In the United States recent high school graduates have no such record and information on high school performance is not available, so the entire graduating class appears to employers as one undifferentiated mass of unskilled and undisciplined workers. A common employer view of 18 year olds was expressed by a supervisor at New York Life Insurance who commented on television **"When kids come out of high school, they think the world owes them a living"** (PBS, March 27, 1989). Surely this generalization does not apply to every graduate, but the students who are disciplined and academically well prepared currently have no way of signaling this fact to employers.

The school can help students get good jobs by developing an equitable and efficient policy for releasing student records. School officials have the dual responsibility of protecting the student's right to privacy and helping them find good, suitable jobs. The student and his or her parents should receive copies (encased in plastic) of transcripts and other records that might be released so that they may make them available to anyone they choose. Schools might also develop a sheet explaining to parents and students their rights, as well as the pros and cons of disclosing information.

According to the Federal Education Rights and Privacy Act, all that a student/graduate must do to have school records sent to a prospective employer is sign a form specifying the purpose of disclosure, which records are to be released, and who is to receive the records. The waiver and record request forms used by employers contain this information, so when such a request is received, the school is obliged to respond. Requiring that graduates fill out a school devised form--as one high school I visited did--results in the employer not getting the transcript requested and the graduate not getting the job. There are probably millions of high school graduates who do not realize that they failed to get a job they were hoping for because their high school did not send the transcript that was requested. Schools can best serve students by handling all inquiries expeditiously and without charge.

#### Credential Data Bank and Employee Locator Service

It may, however, be unrealistic to expect 22,902 high schools to develop efficient systems of maintaining student records and responding quickly to requests for transcripts. An alternative approach would be to centralize the record keeping and dissemination function

in a trusted third party organization. This organization would be easy to regulate and thus everyone could be assured that privacy mandates are being observed. The student would determine which competencies are to be assessed and what types of information are to be included in his/her competency portfolio. Competency assessments would be offered for a variety of scientific, mathematical and technological subjects, languages, writing, business and economics, and occupational skills. Tests with many alternate forms (or administered by computer using a large test item bank) would be used so that students could retake the test a month later if desired. Only the highest score would remain in the system. Students would be encouraged to include descriptions of their extracurricular activities, their jobs and any other accomplishments they feel are relevant, and to submit samples of their work such as a research paper, art work, or pictures of a project made in metal shop. Files could be updated after leaving high school.

Students would have three different ways of transmitting their competency profile to potential employers. First, they would receive certified copies of their portfolio which they could carry to job interviews or mail to employers. Second, they would be able to call a 900 number and request that their portfolio be sent to specific employers. Third, they could ask to put themselves in an employee locator data bank similar to the student locator services operated by the Educational Testing Service and American College Testing. A student seeking a summer or post graduation job would specify the type of work sought and dates of availability. Employers seeking workers could ask for a print out of the portfolios of all the individuals living near a particular establishment who have expressed interest in that type of job and who pass the employer's competency screens. Student locator services have been heavily used by colleges seeking to recruit minority students and an employee locator service would almost certainly be used in the same way. This will significantly increase the rewards for hard study because the employee locator service is likely to result in a bidding war for the qualified minority students whose portfolios are in the system.

The National Alliance of Business, the American Business Conference, the Educational Testing Service and the California Department of Education are currently involved in developing systems like the one just described. Pilot programs are underway in Hillsborough County, Florida, Orange County, California, Fort Worth, Texas, and New Jersey. It is doubtful that a federally sponsored credential data bank would have the credibility with business that is essential for success. With respect to the credential data bank, the best role

for the federal government is probably verbal and limited financial support for a private initiative. Federal funding of the research and development necessary to develop the high quality assessments that might be used by this system would be desirable. A federally sponsored system of subject matter exams taken at the end of high school would speed the development of a credential data bank and would be desirable for other reasons. Current plans, however, envision constructing the credential data bank, state by state and city by city.

### **3.2 Inducing Students to Pursue a More Rigorous Curriculum**

The analysis of the causes of the American apathy regarding teaching and learning has important implications for the curriculum. Many of the weaknesses of math and science curricula--the constant review and repetition of old material, the slow pace and minimal expectations--are adaptations to the low level of effort most students are willing to devote to these subjects. When considering proposed revisions of the curriculum, **one must remember that motivating students to take tough courses and to study hard must be a central concern.**

**This problem would remain even if parents and students were allowed to choose their school.** Even though American high schools differ greatly in standards and quality, employers do not appear to be using high school reputation as a signal when making hiring selections (Hollenbeck and Smith 1984). About 200 competitive colleges do take high school quality into account when evaluating a student's GPA, but most colleges do not. In such an environment it is not clear what will impel parents to send their children to a school that promises a rigorous academic program involving a great deal of homework rather than to a school with a reputation for excellence in hockey.

A second constraint that must be recognized is the great diversity of the learning goals and capabilities of high school students. On the NAEP mathematics scale 15 percent of 13 year olds have better mathematics skills than the average 17 year old student, and 7 percent of 13 year olds score below the average 9 year old (NAEP 1988b). On the NAEP reading scale 16.5 percent of 13 year olds have better reading skills than the average 17 year old student, and 9 percent of 13 year olds score below the average 9 year old (NAEP 1986). The variability of science achievement at age 14-15 is greater in the United States than in 14 of the 16 other countries participating in the Second International Science Study. **Consequently,**

**once they have completed their Certificate of Initial Mastery, it is neither feasible nor desirable for all senior high school students to pursue the same curriculum.** While some nations have a common curriculum with no tracking in elementary school and lower secondary schools, no advanced country has been foolish enough to force all senior high students to take the same courses. Some students will want to pursue subjects like mathematics and science in greater depth and rigor than others. Some students will want to concentrate on technology not pure science. **Some courses will be easier than others and students will inevitably be able to choose between rigorous and less demanding courses.**

State requirements that students take more math and science courses to graduate will have little effect on learning if students meet the requirement by taking undemanding courses. Holding background characteristics and the rigor of the math and science courses constant, an additional three courses in math and science during high school increased the gain in math competency between 10th and 12th grade by only .19 of a grade level equivalent and reduced science gains by .09 of a grade level equivalent and English and social studies gains by .17-.18 of a grade level equivalent. Holding background characteristics and the total number of courses taken in specific fields constant, taking five college preparatory math and science courses--chemistry, physics, algebra II, trigonometry and calculus--increased the gain on math and science tests by .75 of a grade level equivalent and increased the gain in English and social studies by .34-.44 of a grade level equivalent.<sup>9</sup> These data clearly imply that learning rates are determined by the rigor not the number of courses taken in a subject.

Another strategy that can have only very limited effects is requiring passage of a multiple choice minimum competency exam before graduation. There is a danger that many students will stop putting effort into their courses, once they satisfy the minimum.

How then do we convince students to study hard? How do we induce them to select courses that require a lot of work just to be an average achiever in the class? The answer is by **(1) developing rigorous courses that teach students concepts and material that they will use after leaving high school, (2) convincing students that the material being taught is useful by presenting it as solutions to practical real world problems, (3) defining accomplishment in a way that students who work hard will perceive themselves as successful, and then (4) recognizing and rewarding accomplishment.**

Usefulness is an absolutely central criterion for selecting the topics to be included in a curriculum for three reasons. First, the social benefits of learning derive from the use of



the knowledge and skills, not from the fact they are in someone's repertoire. Secondly, skills and knowledge that are not used deteriorate very rapidly. In one set of studies, students tested 2 years after taking a course had forgotten 1/2 of the college psychology and zoology, 1/3 of the high school chemistry, and 3/4 of the college botany that had been learned (Pressey and Robinson, 1944). Skills and knowledge that are used are remembered. Consequently, if learning is to produce long term benefits, the competencies developed must continue to be used after the final exam (either in college, the labor market or somewhere else). Finally, usefulness is essential because students are not going to put energy into learning things they perceive to be useless. Furthermore, the labor market is not in the long run going to reward skills and competencies that have no use. Indeed, selecting workers on the basis of competencies that are not useful in the company's jobs is in most circumstances a violation of Title VII of the Civil Rights Act.

### Differentiating the Senior High Curriculum

By 10th grade most students have a pretty good idea of what kinds of jobs they want after finishing their education. Ninety-seven percent can select a particular occupation they expect to be doing at age 40 and 77 percent agree with the statement: "I am quite certain about what kinds of jobs I would enjoy doing when I am older" (LSAY, Q. AA13C & AA22A). Students who are planning careers in science and engineering need to be able to take college preparatory biology, chemistry and physics courses that prepare them for the core courses they will face in college. The students not planning on scientific careers, however, quite often fail to see how these courses will be useful to them. Less than a quarter of 10th graders believe that geometry, trigonometry, biology, chemistry, and physics are needed to qualify for their first choice occupation (LSAY, Q. BA24B-BA25D).

One approach to this problem, of course, is to point out to students how the material in standard college prep courses is useful in non-scientific jobs and everyday life. Presumably, teachers already try to do this. Another approach is to modify the standard curriculum. That is the approach of the new math and science curriculums proposed by the National Council of Teachers of Mathematics (1989) and the American Association for the Advancement of Science (1989). This makes sense in the first 8 or 9 years of schooling. There is, however, no standard curriculum in 10th, 11th and 12th grade, and it is not realistic to propose that everyone take the same courses. At these grade levels the most effective way to motivate students to take

demanding courses and to study hard is to tailor courses to the student's career interest and to insure that prospective employers are aware that the student took challenging rigorous courses.

### Teaching Science and Math by Infusing it into Technology Courses

Analyses of labor market success of young men and of job performance in the military indicate that young people who expect to have jobs in which they use or maintain complicated pieces of equipment should receive a thorough technology education (Bishop 1990; Hunter Crossen and Friedman 1985; Maier and Grafton 1981). Computer classes are one example of the kinds of courses needed. High school sophomores described their computer classes as "Very Useful" for their career 53 percent of the time and as of "No Use" only 6 percent of the time (LSAY, Q. AACOMF).

The Principles of Technology (PT) course developed by a consortium of vocational education agencies in 47 states and Canadian provinces in association with the Agency for Instructional Technology and the Center for Occupational Research and Development is another example of a course that meets this need very well. This two-year applied physics course is both academically rigorous and practical. Each six day subunit deals with the unit's major technical principle (e.g. resistance) as it applies to one of the four energy systems--mechanical (both rotational and linear), fluid, electrical, and thermal. A subunit usually consists of two days of lectures and discussion, a math skills lab, two days of hands-on physics application labs, and a subunit review. This approach appears to be quite effective at teaching basic physics. When students enrolled in regular physics and Principles of Technology courses were tested on basic physics concepts at the beginning and end of their junior and senior year in high school, the PT students started out behind the regular physics students but obtained an average score of 81 at completion as compared to an average of 66 for those completing a physics course (Perry, 1989). Another study by John Roper (1989) obtained similar results. Comparable courses need to be developed for other fields of technology. This is an area of study that needs much more attention than it has been getting from educational reformers and curriculum developers.

### Massively Expand Advanced Placement Courses

The Advanced Placement program is a cooperative educational endeavor which offers course descriptions, examinations, and sets of curricular materials in 28 different academic subjects. Students who take these courses and pass the examinations receive college credit for high school work. Unlike the SAT, the ACT and all other standardized aptitude and achievement tests which employ the multiple-choice answer format exclusively, these exams require students to write long essays and to work out complicated science and mathematics problems. Hence they are similar in format to the French Baccalaureate, the English A Level, and other exams taken by European students completing secondary school. They are also of roughly comparable difficulty. Consequently, the number of students taking and passing these exams is a good way of monitoring progress toward the goal of closing performance gaps in mathematics and science.

Expanding the AP program should be a centerpiece of any effort to promote excellence in American high schools. It clearly meets a felt need, for it is growing rapidly. The numbers of students taking AP exams more than doubled between 1983 and 1988. Nevertheless, only 8,022 of the 22,902 US high schools participate in the Advanced Placement Program and only 52 AP exams are taken on average in each participating high school. In the Class of 1990 only 3.8 percent took the AP English Literature and Composition exam, 3.6 percent took the American History exam, 3.0 percent took the AP calculus exam, 1.3 percent took the AP biology exam, .8 percent took the AP chemistry exam and .7 percent took the AP physics exam. (The College Board 1988).

**The nation's 50 governors, President Bush, and Speaker of the House of Representatives Thomas Foley, speaking for the Democratic Party, have all proclaimed the goal of surpassing all other countries in mathematics and science by the year 2000. This is a worthy goal. We should be satisfied with nothing less. But it will not be easy to achieve. In the Second International Science Study, for example, the 24 percent of Norwegian youth who take physics in their 12th year of school were better prepared than the less than one percent of American high school seniors who were taking the second year of an AP physics course. Twenty-five percent of Canadians pursue a rigorous chemistry sequence in high school and perform at the same level as the one percent American seniors who are taking their second year of AP chemistry (IAEEA 1988). To achieve the goal of catching up with Canada, Norway, Finland, Germany and France, more than 25 percent of the nation's high school graduates will have to take mathematics**

**and science courses of AP rigor and the standards of these courses will have to increase. In other words, the number of students taking calculus will have to increase by a factor of 8 and the number of students taking courses in Biology, Chemistry and Physics of AP rigor will have to increase by a factor of 25.**

The nation should set a goal of doubling every two years the number of AP courses taken and AP exams passed. New AP exams should be established in principles of technology, electronics, algebra, geometry and trigonometry, probability and statistics, psychology, and business mathematics so that larger numbers of 10th and 11th graders and students planning to attend 2 year technical colleges may participate in the AP program. Acting in concert, the college presidents of a large group of selective 2 year and 4 year colleges should send a letter to every high school principal in the country (with copies to the school board and local newspaper) urging them to establish AP courses in science, mathematics, and technology. They should also announce that starting in 1994, students seeking admission to their school should have taken and passed at least one AP course in their junior year and be taking more than one AP course their senior year.<sup>10</sup>

Federal and state governments can facilitate the growth of the AP program by underwriting the development of AP exams for new subjects, by financing summer institutes for the teachers of AP courses, by subsidizing the fees charged for taking the exam and by offering AP Excellence Awards to students who achieve passing scores on the exam.

To insure that attending a summer institute is considered a plum, compensation should be generous. In 1988, about 40,000 teachers taught AP courses. Rapid expansion of the program will require a yearly increase of 20,000 in the stock of teachers teaching AP courses; and if 30 percent of the increment to the stock were to experience summer institute training for 6 weeks, the cost would be about \$42 million.

The amount of the scholarship award should depend both on the level of student's pass and the eligibility of the student for Pell grants. If the award schedule for those not eligible for Pell grants was \$300 for a 5 (the top score), \$200 for a 4 and \$100 for a 3, and twice that for students eligible for Pell grants, the average award would probably be \$250. In 1990, 326,025 students would have been eligible for an AP excellence award, so the scholarship program would have cost \$82 million. If a good deal of publicity were attached to these awards, they would induce a major expansion of the program and stimulate an upgrading of standards throughout middle school and high school.

### Statewide Networks of Science, Math, History, Literature and Technology Clubs

At present, only 3.2 percent of high school sophmores are members of a science club, only 2.5 percent are members of a math club, and only 1.6 percent are members of a computer club (LSAY, Q. BA10K-BA10M). Only 19,000 students (less than 0.2 percent of all high school students) participate in the annual Westinghouse Science Talent Search.

Memberships in these clubs and participation in the Westinghouse Science Talent Search should be greatly expanded. The clubs should be stiched together into state and national networks. The student organizations should sponsor interschool competitions, visits to science museums, and science and technology project competitions that would feed into first statewide and then national competitions like the Westinghouse Science Talent Search awards. The state and national organizations would fuction in much the same way as the state and national offices of Boy Scouts, Future Farmers of America, and Vocational and Industrial Clubs of America. They would provide training to teachers and student leaders and develop program activity packets to help local science and math teachers devise activities for their club. The federal government can help stimulate the formation of national club networks in academic fields by offering to pay travel costs for the first few national conventions and by contributing to national programing costs. The state club organizations could also be conduits for reimbursing local schools for some of the expenses of local club activities. One of the reasons for the very low participation rates in the Westinghouse Talent Search is the paltry size, only \$140,000, of its national scholarship budget. State and federal money needs to be pumped into this program to a point where states the size of Maryland are awarding more than \$200,000 a year in Science Scholarships.

### 3.3 Creating New Opportunities for Learning in School

#### Two Hours of Homework a Night for All Secondary School Students

States and school districts should have a policy that all high school students are assigned at least 2 hours of homework on weeknights and 4 hours on weekends. In many American high school classes homework is not even assigned. Arthur Powell describes one school he visited:

Students were given class time to read The Scarlet Letter, The Red Badge of Courage, Huckleberry Finn, and The Great Gatsby because many would not

read the books if they were assigned as homework. Parents had complained that such homework was excessive. Pressure from them might even bring the teaching of the books to a halt....[As one teacher put it] "If you can't get them to read at home, you do the next best thing. It has to be done....I'm trying to be optimistic and say we're building up their expectations in school."(Powell, Farrar and Cohen 1985, p.81)

It's not just reading that teachers feel they cannot require. A high school history teacher who had previewed PBS's 11 hour series on the Civil War and who had participated in developing teaching materials associated with the series was asked by a reporter whether he was assigning it to his class. The teacher replied that unfortunately he could not because 11 hours was way beyond what most high school students were willing to commit to an assignment.

Careful time budget studies conducted in the early 1980s found that American high school students spent an average of only 3.8 hours a week on homework compared to an average of 19.6 hours per week in Japan (Juster and Stafford 1990). If American high schools assigned and American students did a great deal more homework, achievement would be substantially higher. That is the conclusion of Harris Cooper's (1989) meta-analysis of the literature on homework. Experimental studies find that when high school students are assigned homework, they score about half a standard deviation higher on the posttest than the control group. The impact of homework on the rate at which middle school students learn is also significant, though somewhat smaller. There is no evidence of diminishing returns as the amount of homework is increased. Non-experimental studies tend to find that the relationship between homework and learning is linear.

### Turn Schools into All-Day Learning Centers

The length of the school day should be extended from 6 to 7 hours. A full range of remedial and enrichment programs and extracurricular activities and intramural sports should be offered during the extra hour. Students making normal progress might choose whatever alternative they desire. Many students do not have a quiet place to study at home, so the library, the computer lab, and a number of classrooms should remain open and supervised during this period. Extra help would be available for students having difficulty with the core curriculum. Volunteers to provide tutoring and to offer special interest courses could be recruited from the community. Private teachers of music, art, and other subjects might also be allowed to use school facilities during these hours. The benefit of this reform is that: (1)

the regular school day would be freed up for more intensive study of the core curriculum, (2) more homework could be assigned and all students would have a quiet place to study, (3) slower students would be given the extra instruction they need, (4) enrichment programs could be expanded, and (5) the phenomenon of the latch key child would be significantly reduced or eliminated.

#### Increase the School Year from 180 to 200 Days

Longitudinal studies of learning have found that students appear to forget during the summer a portion (up to 1 to 2 months worth) of the mathematics they learned during the previous school year. Rates of gain in reading ability tend to either decline or slow dramatically during the summer. The learning loss is particularly large for disadvantaged students and for minority students (Heyns 1987). As a result, much of September is devoted to review and practice of the material taught the previous year. In The Underachieving Curriculum, the report which presented and analyzed the reasons for poor American performance in the Second International Mathematics Study, Mc Knight et al (1988) severely criticized this practice of allocating so much time to review of old topics rather than to the presentation of new material. These findings clearly suggest that school attendance is essential if math and reading skills are to improve and that a longer school year would not only increase learning time but also reduce forgetting time. Adding a month to the school year could very well produce a more than proportionate increase in learning.

Studies of the effect of summer school confirm the educational impact of additional instruction time. The best study of this issue used a random assignment control group methodology to evaluate the Summer Training and Employment Program (STEP), a program for disadvantaged youth that combines a part time summer job with about 90 hours of remedial instruction. It found that adding the instruction to the summer job raised academic achievement by .5 grade level equivalents above that of youth receiving only a part time job. (Sipe, Grossman and Milliner 1988). The documented success of the STEP intervention has resulted in its replication (with federal support) in 33 different school systems.

This evidence indicates that extending the school year would not only raise educational standards generally, it would also help children from educationally and economically disadvantaged backgrounds keep up with their more advantaged peers.

#### Accelerating the Pace of Instruction

Increasing the time devoted to learning by one-ninth or more has major implications for the curriculum. The learning objectives specified for each year would need to be changed. In subjects which follow a sequence such as mathematics, reading, and spelling, material taught at the beginning of third grade might be moved to the end of second grade, eighth grade topics might be taught in seventh grade, etc. In mathematics, for example, algebra might now begin in 7th grade, geometry in 8th or 9th, and probability and statistics (which is necessary for implementing statistical process control) might become a regular part of the high school curriculum. For students headed for college, the final two years would be given over to AP courses. College freshman would arrive much better prepared than they are now. A decision would have to be made whether (a) the bachelors degree should become a three year degree, (b) the number of credits for graduation should be increased, or (c) college courses should be made more rigorous with a corresponding reduction in the number of credits that students can carry per semester.

#### The Federal Government Role in Instigating a Lengthening of the School Year

A major increase in the length of the school year is unlikely to evolve without federal leadership and funding support. If one state were to try to do it alone, it would confront all sorts of difficulties. Standard textbooks would not fit the new curriculum and the per-pupil costs of curriculum revision would be very high. Graduates would be more productive workers, but one doubts that employers would pay graduates who attended college ten months a year a higher wage than graduates who attended nine months a year. While local public colleges could be expected to adapt, problems would arise when students attend college out-of-state.

The most significant barrier to this reform, however, is the cost. If teachers are to spend 11 percent more time teaching, yearly salaries must be increased by a comparable percentage. Since current public expenditures on elementary and secondary education were \$156 billion in 1988 (US Bureau of the Census 1989, Table 229) some of which would not have to be increased (e.g. central office staff already have 11 month contracts), the taxpayer cost would be about \$15 billion. This is not really as big a number as one might think. For comparison, between 1985 and 1988 total compensation of employees rose \$73 billion in state and local government as a whole and rose \$50 billion in the health care industry. Since more than half of the mothers of school children work, the savings in day care costs would be substantial. If one-fifth of the 45 million school children attending school



an extra 20 days would have required day care costing \$3.00 an hour for 6 hours a day, the savings would be \$3.24 billion. Since most teachers and students do not work in the summer, the increase in learning time would come primarily out of leisure not work time. GNP would immediately increase because the rise in teacher pay and labor released by the reduced demand for child care would be larger than the induced decline in summer job earnings of teachers and students. If GNP rises, taxes will rise as well, so the change would be partially self financing.

The long term benefits would be very large. Because a longer school year reduces summer forgetting as well as increasing learning time, it is quite possible that a more than proportionate learning response (on a grade level equivalent scale) would result. Let us, however, make the conservative assumption that the 11 percent increase in learning time increases 12th grade achievement scaled in grade level equivalents by 11 percent or 1.33 U.S. grade level equivalents. Student cohorts experiencing the longer school year for 13 years would have their compensation increased by about 5.2 percent or \$830 a year.<sup>11</sup>

The productivity effects of test score increases are 50 percent larger than wage rate effects (Bishop 1987a, 1987b). Consequently, increasing the school year by 20 days and is estimated to raise the productivity of the average adult by \$1248 per year (7.7 percent of mean compensation). Since a one year age cohort contains 3.7 million people, the benefit is about \$ 4.62 billion dollars per year. The yearly real rate of return is 30.7 percent on the taxpayer contribution to the additional learning investment.<sup>12</sup> Only investments in R&D have real rates of social return this high. If the real rate of social discount is 6 percent and the growth of labor productivity is projected at 2 percent per year, the ratio of present discounted benefits to costs is 4.9 to 1.<sup>13</sup> Even if the additional month of school produces only a third or a half month of learning gains, the investment has a higher payoff than most other uses of taxpayer dollars.

#### Voluntary Summer School

A variety of remedial, enrichment, and special interest short courses should be offered during the rest of the summer. While many of the teachers would be regular school staff, an education degree and state certification would not be required. Private teachers of music, art, athletics, and academic subjects could also offer their own courses at the school. Where

appropriate, academic credit would be given for the summer school courses. The school district would provide transportation.

### **3.4 Generating Additional Recognition and Rewards for Learning**

#### **A Massive Dose of Mastery Learning**

Students who are not learning at the desired rate should be expected to commit additional time to the task after school and during the summer. At the beginning of the school year school personnel would meet with the student and his or her parents to set goals. Students who are not performing at grade level in core subjects and who do not make normal progress during the school year should be kept after school for tutoring and remedial instruction and required to attend summer school. Assessments of progress should be made at appropriate points during the school year to inform students of their progress and to enable those who are participating in remedial programs after school to demonstrate they are now progressing satisfactorily. Course grades and teacher evaluations would be a central part of the assessment process, but there should be an external yardstick as well. The external yardstick might be a competency check list, a mastery test keyed to the textbook, or an exam specified by the state, the school or collectively by the teachers in that grade level or department. The assessment tools would be established at the beginning of the school year. The reason for the external yardstick is that it helps insure that students perceive the standard to be absolute rather than relative to others in the class, and it helps create a communality of interest between teacher and student. Teachers need to be perceived as helping the student achieve the student's goals not as judges meting out punishment. Final decisions regarding who would be required to attend summer school could be made by committees of teachers, possibly with some administrative representation. Since students will want to avoid being required to get remedial instruction after school and during the summer, this will be a powerful incentive for them to devote themselves to their studies.

#### **Acting as a Source of Informal Contacts**

School personnel can be a reference and a source of job contacts for their students. Some students may feel that they do not have and cannot develop good employment contacts. School personnel can help out by building and maintaining trusting relationships with local employers and then helping to match employer and student needs. Students from disadvantaged backgrounds have special need for this kind of help, because their relatives and neighbors typically lack the employment contacts of middle-class families.

Many schools provide job placement and referral services for their students and graduates. Three and a half million people found their current job through a referral by a teacher, school or college (Rosenfeld 1975). This function of schools is a lot more important than is generally thought.

Whenever possible, there should be a one-on-one relationship between a specific teacher or administrator and an employer. A study by McKinney et al. (1982) found that when schools formalize this relationship by creating a placement office, the number of jobs found for vocational students tended to decrease. The best example of an informal contact system is the one that exists for many vocational students. Vocational teachers often know local employers in related fields; they also know their students well enough to recommend them. This kind of informal system could be expanded to include all students not planning to attend college.

#### Developing a Job Search Portfolio

Schools should consider providing students with a job search portfolio or competency profile that records all their accomplishments in one place. Students attempting to market themselves to employers will have greater success if all their school achievements are summarized in one compact, standardized document. Compactness and standardization make it easier for employers to use information in their hiring decisions and this facilitates information flow.

The coverage and format of the document are probably best worked out cooperatively by a committee that includes school administrators, employers, and other interested parties. Developing and using such a document might be a part of a campaign to enlist commitments from major local employers to hire the school's graduates. Developing the information system cooperatively is a good way to ensure that the finished form will be beneficial to schools, employers, and students.

Students have many talents and skills that can be highlighted in such a document. The job search portfolio should emphasize accomplishments and performance indicators that are most useful in identifying a good match between a job and a youth. Students and parents should receive copies of it, and students should be encouraged to bring copies with them when they apply for jobs. Employers should be encouraged to ask to see the portfolio and keep a copy when a job application is filed.

### Honoring Academic Achievement

Schools should strengthen their awards and honors systems for academic and non-academic accomplishments. The medals, trophies, and school letters awarded in interscholastic athletics are a powerful motivator of achievement on the playing field. Academic pursuits need a similar system of reinforcement. Awards and honors systems should be designed so that almost every student can receive at least one award or honor before graduation if he or she makes the effort. Outstanding academic performance (e.g., high grades or high test scores) would not have to be the only way of defining excellence. Awards could be given for significant improvements in academic performance since the previous year or since the beginning of the school year, for public service in or out of school, for perfect attendance records, and for student of the week (criteria could vary weekly). The standard for making an award should be criterion referenced: if greater numbers achieve the standard of excellence, more awards should be given.

A prominent place in the school should be reserved for bulletin boards where pictures of the most recent winners and reasons for their receiving recognition could be posted. Another form of recognition could be displays of student work: art, science, social studies, vocational education projects, and so forth. Periodically, the parents of the most recent award winners and sponsoring teachers should be invited to an evening assembly at which time the principal would award the students the certificate or plaque recognizing their accomplishments.

### Award Scholarships on the Basis of Past Academic Achievement as well as Need

At present, almost all grant aid for attending college is awarded on the basis of financial need. Athletic achievement also results in generous scholarships for attending state universities. Academic achievement does not. A balance needs to be restored. States should either start or expand existing scholarship programs which award grants on the basis of academic achievements assessed by criteria that are external to school such as the Advanced

Placement exams, Westinghouse Science Competitions and statewide Vocational-Industrial Club Competitions, New York State Regents Exams or the national examination proposed by Educate America. These scholarships should not be awarded on the basis of rank in class or GPA for this pits students from the same school against each other and results in peer norms which scorn the student who spends his/her time studying. Aptitude test scores should also not be used to make scholarship awards. The purpose of scholarships is to reward effort and accomplishment not "talent" or IQ.

#### League Competitions between Schools in the Academic Arena

Band and athletic programs receive very generous support from the community because the band and the team are viewed as representing the entire high school to neighboring communities and the rest of the state and because their accomplishments are highly visible. A similar spirit of competition between communities needs to be developed in the academic arena. States should establish a system of highly visible competitions for each academic subject and for extracurricular activities like debate, inventions club, Junior Achievement, school newspaper, and the stock market game. As many students as possible should participate. This can be accomplished by arranging separate competitions for each grade, requiring (where possible) the school to field a team that includes all students taking a particular course and having the share of the student body that is on the team be one of the criteria by which schools are judged. As in sports, fair competition can be insured by placing small schools and schools serving disadvantaged populations in a separate league or by establishing a handicapping system.

The competitions should not be a glorified Trivial Pursuits game. While cable TV broadcasts of High School Bowl like contests might be a component of the program, most of the points obtained by a school's team should come from assessments of the performance of the entire team on authentic tasks like writing an essay, giving a speech, determining the chemical composition of a compound, working out long mathematics problems, writing a computer program, or fixing a car. As much as possible the tasks should be aligned with the state curriculum for that subject. Teams should consist of entire classrooms of students and everyone on the team should receive gaudy tee shirts proclaiming membership on the school's team.

Winning schools and departments should receive a silver cup symbolizing their victory and a sum equal to \$100 per team member that can be used the following year for materials

and travel. A celebration dance for the entire school might be organized and paid for by a special prize fund. Members of teams placing in the top ten percent of their league would be recognized at an evening assembly, receive school sweaters or jackets proclaiming their victory and a \$100 scholarship. These competitions could also serve as a basis for individual recognition and scholarships.

#### **IV. FEDERAL POLICY RESPONSES**

- \* Setting an example in federal hiring,
- \* Greater use of improved employment tests,
- \* Creating New Opportunities for learning outside of school

##### **4.1 Setting an Example in Federal Hiring Decisions**

###### **The Federal Government Should give Greater Weight to Academic Achievement in its Own Hiring**

The federal government is the largest employer in the nation. It should set an example for the private sector by announcing that hence forth it is giving greater weight to academic achievement in high school and college than it has in the past.

The military currently admits recruits into the military on the basis of AFQT scores and the high school diploma. The current AFQT is an average of scores on the verbal, arithmetic reasoning and mathematical knowledge subtests of the Armed Services Vocational Aptitude Battery, ASVAB. By adding the general science, electronics knowledge, mechanical comprehension and the auto/shop knowledge tests to the composite which defines the AFQT, the military would simultaneously increase the validity of their selection and improve incentives to study science and technical subjects in high school.

The Office of Personnel Management is designing a biodata form to be used for selecting professional and managerial personnel for the federal government. The current draft of the form asks applicants a number of questions about the grades in high school and college and about class rank. It does not ask about the difficulty level of the courses taken (Office of Personnel Management, 1987). Current plans are to request that transcripts be sent only

for a sample of the applicants and to use this data only for checking the accuracy of the information provided. If discrepancies are discovered for people who were hired, the cases will be referred to investigators. The questions are worded in such a way, however, that only the most outrageous of distortions can be proved to be a lie and therefore are grounds for dismissal. The following changes in civil service hiring procedures are recommended:

- o All candidates for civil service jobs (including clerical jobs) should be required to send their high school and college transcripts.
- o After a preliminary screening on the basis of the biodata key, course grades and difficulty level indicators should be coded for the most recent school attended.
- o Final rankings should be based on a combination of the transcript information, biodata, scores on job relevant tests and other relevant information.

This change will increase hiring costs but the benefits of greater validity and improved incentives outweigh these costs by a large margin.

#### **4.2 Greater Use of Improved Employment Tests**

##### **Add Subtests Measuring Technical, Scientific and Advanced Mathematical Competency to the General Aptitude Test Battery**

The Employment Service's program of validity research for the GATB has made this test one of the few employment tests whose validity (as a predictor of job performance) has been generalized for a great variety of jobs. The content of the GATB was set in the 1940's and there has been little change in the content of the academic subtests since then. The nature of jobs has changed substantially and it is time to rethink the content of the GATB. Research conducted by the military into the validity of the ASVAB indicates that the validity of the GATB would be substantially increased by adding subtests measuring technical, scientific and advanced mathematical knowledge and skills. The Department of Labor should immediately add subtests similar to the technical, mathematical knowledge and science subtests of the ASVAB to the GATB and include these subtests in the composites that are used for recommending clients to civilian jobs that are similar to the jobs studied in the military. The employment service should also undertake a major study of the validity of the new GATB in the full spectrum of civilian jobs.

The fear of litigation has significantly inhibited testing research outside of government. Companies no longer share the results of their validity studies or allow them to be published

(even when the company's name is withheld) for fear of revealing their defense strategy to a potential litigant. As a result, research on tests other than the GATB has been inhibited. The government needs to step into the vacuum it has created and sponsor a major increase in research into the development and validation of improved employment tests.

EEOC Regulations Should Encourage the Use of Broad Spectrum Achievement Test Batteries rather than IQ Tests and the Current GATB

A 1987 survey of small and medium size firms found that only 3 percent of new hires in the previous year had taken employment aptitude tests as part of the selection process. This has substantially reduced the rewards for learning.

The Supreme Court's decision in the Wards Cove Packing Case has shifted the burden of proof in adverse impact cases on to the plaintiff and has therefore opened the door for increased use of employment tests. It appears that employers will be able to justify the use of employment tests without having to undertake costly validity studies in their own firm by citing validity research done for similar jobs in other firms. Since civilian research on test validity has used the GATB almost exclusively, there is a very real danger that most firms will choose to use reading, vocabulary, and arithmetic reasoning tests that are demonstrably similar to their GATB counterparts. Unfortunately, the verbal and mathematical subtests of the GATB are considerably less valid than tests measuring a broader range of competencies and do not generate incentives for students to study history, algebra, trigonometry, and science.

Courts have in the past required that employers demonstrate that each question on an employment test has a specific application in each job for which it is a proposed selection device. To avoid having to redesign tests for each job, test developers are likely to dumb the test down and include only simple questions covering mathematical, scientific and technical principles that are learned in grade school. Litigation costs and the potential liability are enormous so companies have become extremely cautious about testing. When selecting a test, defensibility in court has become a much more important criterion than maximum validity. Given the uncertainty of whether ASVAB research will be accepted as evidence on the validity of similar tests for civilian jobs, broad spectrum achievement test batteries will probably be judged too risky. A well designed validity study can protect a firm using an unconventional test battery but in most cases the potential benefit of finding a more valid selection method will not outweigh the costs of the study and the greater risks of litigation. If things are left as they are, it will be at minimum a decade before tests measuring



competence in algebra, science and the technical arena can be used as general selection devices for craft and other blue collar jobs. Firms need to be given a signal by the EEOC that broad spectrum achievement tests are acceptable selection devices and in fact preferred over the low level basic skills test that serves as the 'g' aptitude of the GATB.

For employment tests to generate incentives to learn, students, parents and teachers must be aware that local employers are using tests for selection and what kind of material is included on these tests. Unfortunately, the fear of litigation has caused many employers to give only limited publicity to their use of tests. This is another reason why employers need to be told by people in authority that they are acting in the national interest when they seek out and reward those who have high level academic skills.

### **4.3 Creating New Learning Opportunities Outside of School**

#### **Greatly Expand Educational Programming on T.V.**

American youngsters spend an average of 23 hours a week watching television. This is more time than they spend engaged in school sponsored learning activities and more time than the students in any other nation. Higher standards, longer school days and the expansion of nursery schools will reduce the U.S. figure (college students, for example, watch substantially less TV than high school students) but time spent in front of a TV set is probably going to remain high. This can, however, be viewed as an opportunity, for television has a vast potential as a positive educational force. Programs like Sesame Street, 3-2-1 Contact, Square One, NOVA and National Geographic are examples of what is possible. But these excellent programs account for a very small share of broadcast time. Transformers, GI Joe, Bugs Bunny and MTV are cheaper to produce and are more effective advertising vehicles, so they dominate the airwaves during the afternoon. Only a society that places little value on the transmission of its cultural heritage to the next generation would allow such a powerful medium for instructing the young to be guided solely by what sells toys, cereals and popular records.

If TV is to begin to achieve its educational potential we need: (1) more and above all better funded educational channels, (2) increased federal funding of the production of educational programs, (3) to establish better mechanisms for obtaining high school or college credit and employer recognition for the learning that results from distance learning, (4) a requirement that every channel devote at least X percent of its air time (including specified

percentages of late afternoon and prime time) to educational fare.<sup>14</sup> If such a requirement were deemed unconstitutional, the government could buy time for educational programming using revenue from a tax on television advertising.

One of the concerns that is sometimes expressed about federal funding of educational TV programs is it might give a single decision maker too much power. This danger can be avoided by maintaining the current dispersal of funding authority among many different governmental agencies. NSF, NIMH, NASA, National Endowment for the Humanities, and the Department of Education have all funded programs in the past and additional agencies should be recruited. Another safeguard that could be instituted would be to require that contracts be signed with production companies or educational institutions and not directly with networks or commercial stations. This would mean that the federal authority to fund educational programs would give it no leverage over the news departments of commercial stations and networks.

## **V. EFFECTS OF PROPOSED REFORMS ON UNDER-REPRESENTED MINORITIES**

The two blue ribbon commissions that have recommended improvements in the signaling of academic achievement to colleges and employers included substantial representation from the minority community.<sup>15</sup> Nevertheless, the reader may be wondering about the likely impacts of the reform proposals just described on the labor market chances of minority youth. Since minority students receive lower scores on achievement tests, it might appear at first glance that greater emphasis on academic achievement will inevitably reduce their access to good colleges and to good jobs. This is not the case, however, for four reasons.

If academic achievement becomes a more important basis for selecting students and workers, something else becomes less important. The consequences for minorities of greater emphasis on academic achievement depends on the nature of the criterion that becomes deemphasized. Substituting academic achievement tests for aptitude tests in college admissions **improves minority access** because minority-majority differentials tend to be smaller (in standard deviation units) on achievement tests (e.g. the NAEP reading and math tests) than on aptitude tests (e.g. the SAT). Greater emphasis on academic achievement **improves the access of women** to high level professional, technical, craft, and managerial jobs because it

substitutes a criterion on which women do well for criteria--sex stereotyped beliefs about which jobs are appropriate for women--which have excluded women in the past.

For the same reason, greater emphasis on academic achievement when selecting young workers will not reduce minority access to jobs if it substitutes for other criteria which also place minority youth at a serious disadvantage. The current system in which there is almost no use of employment tests and little signaling of high school achievements to the labor market clearly has not generated jobs for minority youth. In October 1985, 1986, 1987 and 1988, only 45 percent of the previous spring's black high school graduates not attending college were employed (Bureau of Labor Statistics 1989). One reason why minority youth do poorly in the labor market is that most of the criteria now used to make selections--previous work experience, recommendations from previous employers, having family friends or relatives at the firm, proximity of one's residence to stores which hire youth, performance in interviews, and prejudices and stereotypes--work against them. These criteria will diminish in importance as academic achievement becomes more important. There is no way of knowing whether the net result of these shifts will help or hinder minority youth seeking employment. In some models of the labor market the relative position of minority workers improves when academic achievement is better signaled (Aigner and Cain, 1975).

The second way in which minority youth may benefit from improved signaling of school achievements is that it will give recent high school graduates, both black and white, the first real chance to compete for high-wage, high-training content jobs. At present all youth are frozen out of these jobs because primary labor market employers seldom consider job applicants who lack considerable work experience. Experience is considered essential partly because it contributes to productivity but also because it produces signals of competence and reliability that employers use to identify who is most qualified. Recent high school graduates have no such record and information on the student's high school performance is not available, so the entire graduating class appears to employers as one undifferentiated mass of unskilled and undisciplined workers. A black personnel director interviewed for a CBS special on the educational reform proudly stated, "We don't hire high school graduates any more, we need **skilled workers**" (CBS, September 6, 1990). Surely this generalization does not apply to every graduate, but those who are disciplined and have skills currently have no way of signaling this fact to employers. State exams, competency portfolios and informative graduation credentials would change this unfair situation and give students a way of

demonstrating that the stereotype does not apply to them. Young people from minority backgrounds must overcome even more virulent stereotypes and they often lack a network of adult contacts who can provide job leads and references. By helping them overcome these barriers to employment, competency portfolios are of particular help to minority youth.

The third way in which these proposals will assist minority students is by encouraging greater numbers of firms to undertake affirmative action recruitment. The creation of a competency portfolio data bank that can be used by employers seeking qualified minority job candidates would greatly reduce the costs and increase the effectiveness of affirmative action programs. Affirmative action has significantly improved minority representation in managerial and professional occupations and contributed to a substantial increase in the payoff to schooling for blacks (Freeman 1981). One of the reasons why it has been particularly effective in this labor market is that college reputations, transcripts and placement offices provide brokering and pre-screening services which significantly lower the costs of recruiting minority job candidates. The competency portfolio data bank would extend low cost brokering and pre-screening services to the labor market for high school graduates. The creation of such a data bank would almost certainly generate a great deal of competition for the more qualified minority youth in the portfolio bank.

The final and most important way in which these reforms will benefit minority youth is by bringing about improvements in academic achievement and productivity on the job. Student incentives to study hard, parental incentives to demand a better education, and teacher incentives to both give more and expect more from students will all be strengthened. Because of the way affirmative action is likely to interact with a competency profile data bank, the rewards for learning will become particularly strong for minority students. Learning will improve and the gap between minority and majority achievement will diminish. Society has been making considerable progress in closing achievement gaps between minority and majority students. In the early National Assessment of Educational Progress (NAEP) assessments black high school seniors born between 1952 and 1957 were 6.7 grade level equivalents behind their white counterparts in science proficiency, 4 grade level equivalents behind in mathematics, and 5.3 grade level equivalents behind in reading. The most recent National Assessment data for 1986 reveal that for blacks born in 1969, the gap has been cut to 5.6 grade level equivalents in science, 2.9 grade level equivalents in math, and 2.6 grade level equivalents in reading (NAEP 1988, 1989). Koretz's (1986 Appendix E) analysis of data from state testing programs

supports the NAEP findings. Hispanic students are also closing the achievement gap. These positive trends suggest that despite their limited funding, Head Start, Title I, and other compensatory interventions have had an impact. The schools attended by most minority students are still clearly inferior to those attended by white students, so further reductions in the school quality differentials can be expected to produce further reductions in academic achievement differentials.

The students of James A. Garfield's Advanced Placement calculus classes have demonstrated to the nation what minority students from economically disadvantaged backgrounds can accomplish. The student body is predominantly disadvantaged minorities; yet in 1987 only three high schools in the nation (Alhambra High School in California and Bronx Science and Stuyvesant High School in New York City) had a larger number of students taking the AP calculus exam. This high school and its two very talented calculus teachers, Jaime Escalante and Ben Jimenez, are responsible for 17 percent of all Mexican Americans taking the AP calculus exam and 32 percent of all Mexican Americans who pass the more difficult BC form of the test (Matthews, 1988). There is no secret about how they did it; they worked extremely hard. Students signed a contract committing themselves to extra homework and extra time in school and they lived up to the commitment. What this success establishes is that minority youngsters can be persuaded to study just as hard as the academic track students in Europe and that if they do they will achieve at world class levels. The success at Garfield High is replicable.

### Postlude

Institutional arrangements of schools and the labor market have profound effects on the incentives faced by students, teachers, parents, and school administrators. The passivity and inattention of students, the low morale of teachers, the defeat of so many school levies and low rankings on international measures of achievement are all logical outcomes of institutional arrangements which weaken student incentives to study and parental incentives to fund a high quality education. Only with an effective system of rewards within schools and in the labor market can we hope to overcome the pervasive apathy and achieve excellence.

## APPENDIX ON THE SUMMER DROP OFF IN STUDENT PERFORMANCE

Studies which have administered mathematics tests to students both in the spring and the fall of a calendar year find that mathematics competence declines during the summer months (Heyns 1986, 1987). Entwisle and Alexander's (1989 table 1) study of 1st and 2nd graders in Baltimore, for example, found no gain in mathematics skills between the April test administration and the October test administration, even though that period contained two full months of classroom study of arithmetic.

In the Sustaining Effects Study, the beginning of the year test was administered during the third week of school and the end of year test was administered five weeks before the end of the term. Consequently, the school year testing period was only 7 months long and the 5 month "summer gap" between spring and fall testing contained 2 months of school learning time. As one can see in Figure 1, gains in reading slow considerably during the 5 month summer gap period and math competence hardly rises at all (Klibanoff and Haggart 1981). If children were learning during the 2 months of classes included in the summer gap period at anything like the rate they learn during the rest of the school year, their reading and math skills must have declined during the summer months. In most classrooms the first few weeks are spent reviewing and practicing skills taught in previous years. Old material can probably be relearned at a more rapid rate than new material is learned, so this is likely to be a period of particularly rapid rise in test scores. The most reasonable assumption is that learning rates during school time are constant. Figures 2 and 3 (taken from Hemenway et al. 1978) present the results of calculating learning trajectories and the 3 month summer drop off under the assumption of constant learning rates during the school year.

Direct evidence on this issue can be found in the evaluation of STEP. In this study the initial test was administered after the end of school in June and the end of summer administration was prior to the beginning of school in the fall. In this study the control group which received no instruction during the summer experienced very large declines in mathematics and substantial declines in reading.

Figure 1

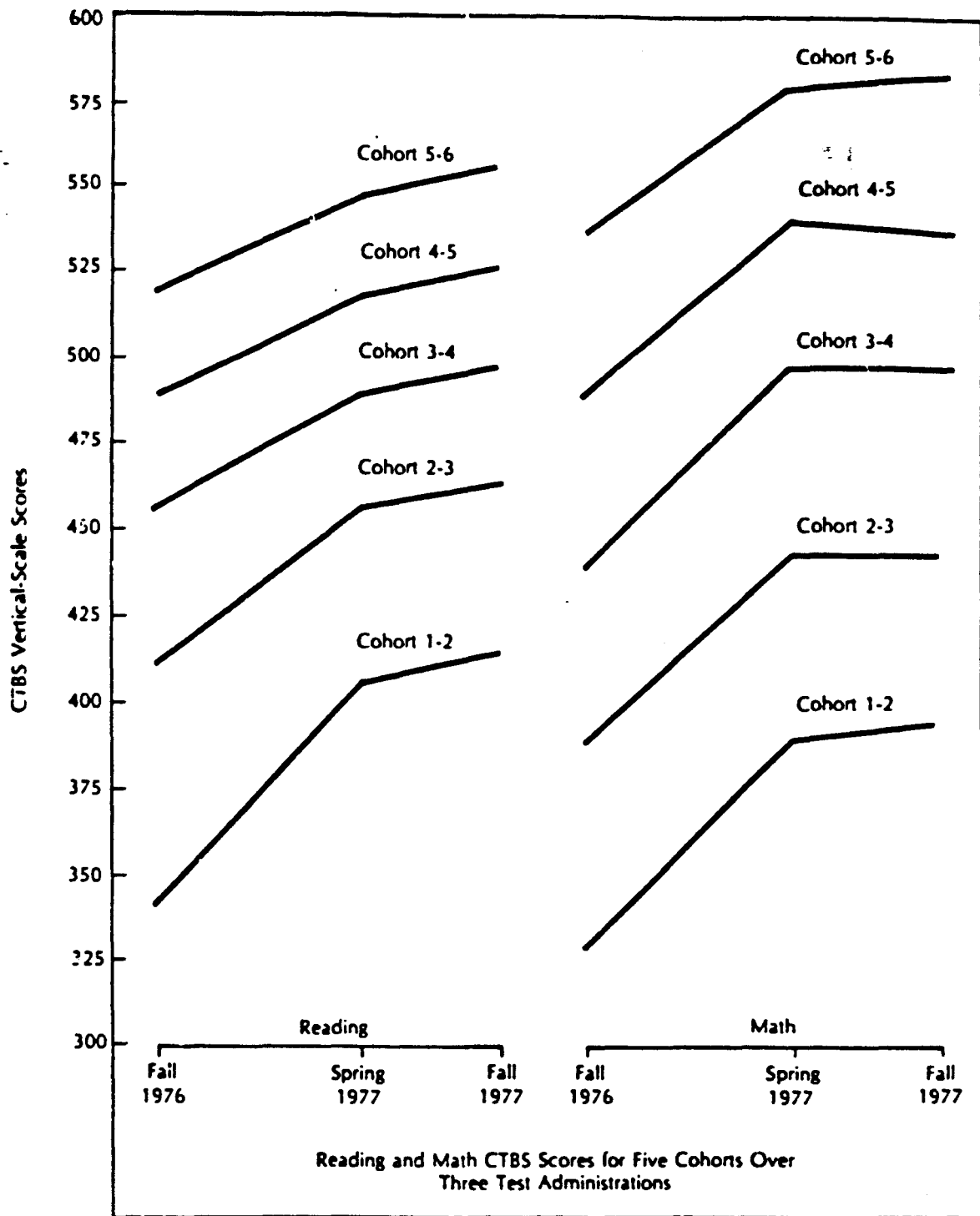


Figure 2

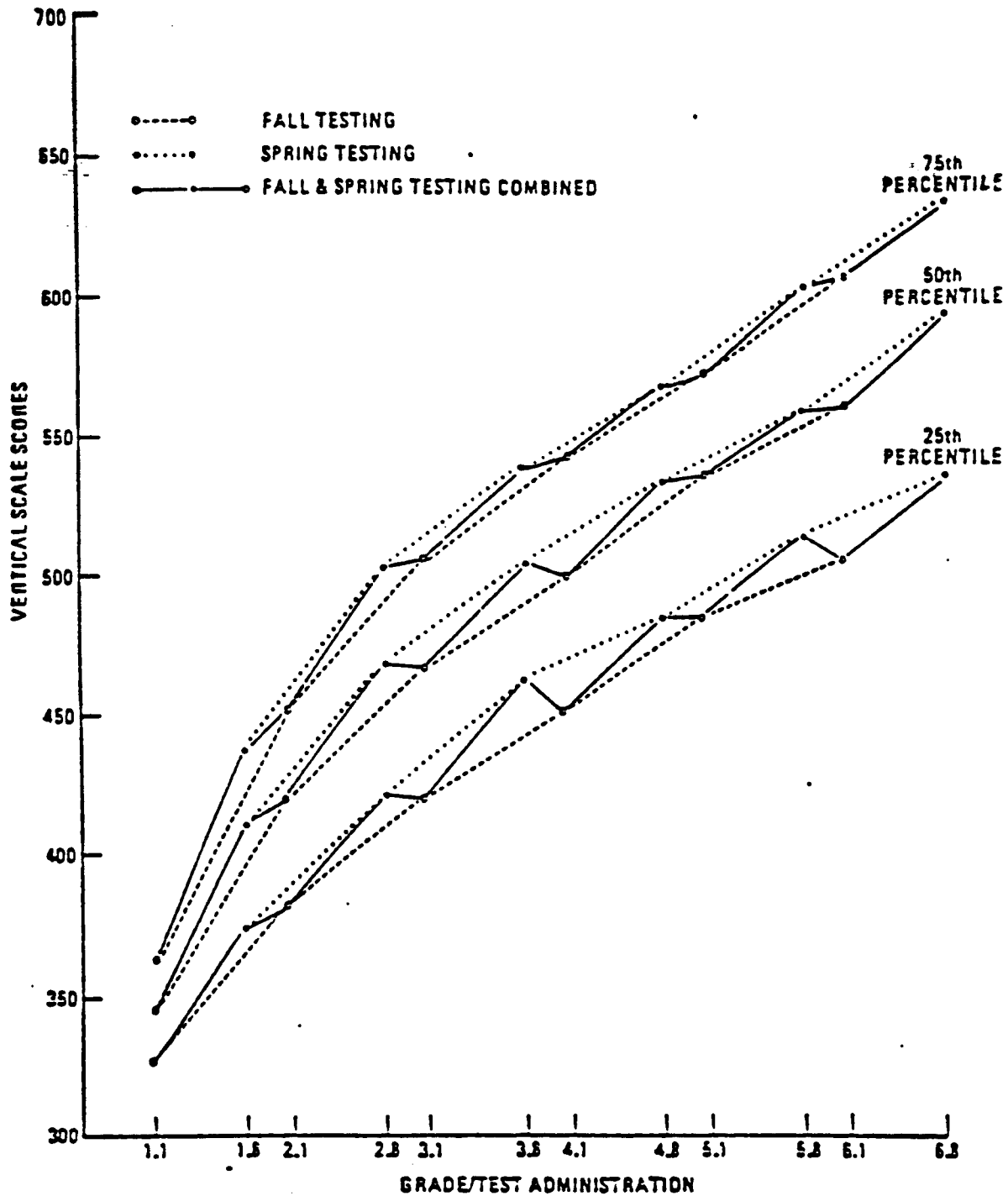


Figure 2. Vertical Scale Scores as a Function of Grade Level by Quartiles for the Debiased CTBS Reading Test

Note: The spring-to-fall differences are always associated with cross-sectional changes in samples and are frequently also associated with differences in test levels. Negative 'growth', when it occurs, may be attributed to sample differences and test-level differences. When raw scores are compared for the same test levels, the differences are either positive or small when negative. Therefore, the zig-zag nature of the curves above should not be carelessly attributed to 'summer drop-off'.

Source: Hemenway et al. (1978), Figure 1-1, p. 29.



Figure 3

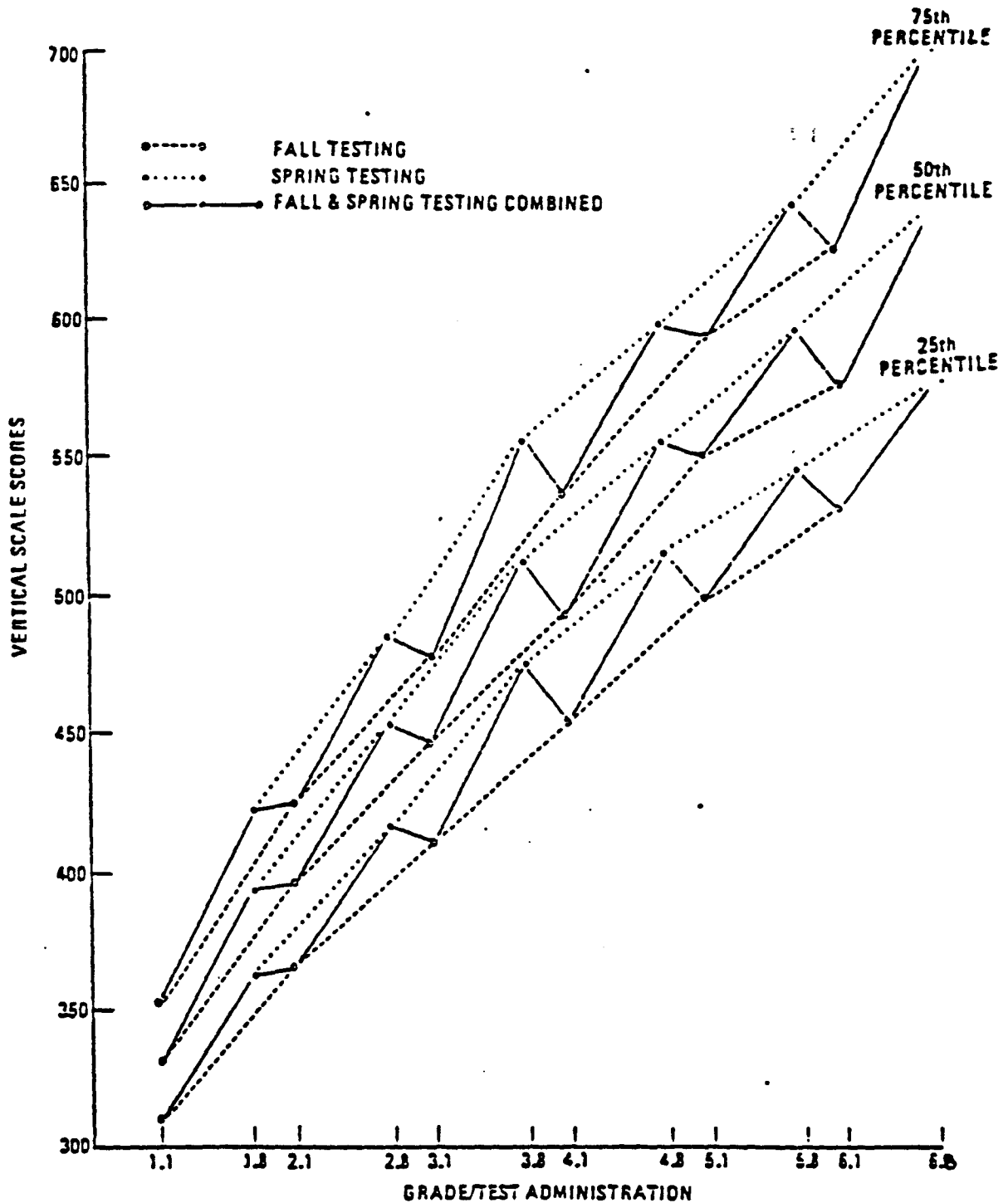


Figure 3. Vertical Scale Scores as a Function of Grade Level by Quartiles for the Debiased CTBS Math Test

Note: The spring-to-fall differences are always associated with cross-sectional changes in samples and frequently also associated with differences in test levels. Negative 'growth', when it occurs, may be attributed to sample differences and test-level differences. When raw scores are compared for the test levels, the differences are either positive or small when negative. Therefore, the zig-zag nature of curves above should not be carelessly attributed to 'summer drop-off'.

Source: Hemenway et al. (1978), Figure 1-2, p. 30.

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## ENDNOTES

1. U. S. Bureau of the Census, Characteristics of Men with College Degrees: 1967, Current Population Reports, Population Characteristics, Series P20, No. 201, p. 23.
2. U.S. Bureau of the Census, Current Population Reports, Series P-70, No. 11, What's It Worth? Educational Background and Economic Status: Spring 1984, U.S. Government Printing Office, Washington, D.C., 1987. The very large differentials between college majors found in these data reflect both differences in wage rates and in hours worked per month. If gender were controlled, the differentials would be smaller.
3. Estimates of average total compensation of teachers in the United States were obtained by multiplying teacher salaries derived from NEA data by the ratio of compensation to wages and salaries in the public education sector, 1.25, from the national income accounts. The data on average compensation in other countries is from UNESCO Statistical Yearbook, 1985 AND 1986. Purchasing power parity exchange rates were calculated by Prof. Robert Summers from OECD data. Steven Barro and Larry Suter, "International Comparisons of Teachers' Salaries: An Exploratory Study," National Center for Education Statistics, July 1988, Table 5.
4. In game theory language, we have here a repeated game in which players may make side payments using the currency of friendship. Parents and college admissions officers (but not employers) offer prizes to those who do best in the academic game, but if everyone improves together the total amount of prize money does not rise. Some players are offered larger prizes than others. For most players the offered prizes are small by comparison to the costs of hard study and the side payments available from peers. The result is that only a few students (those facing the biggest prizes and the smallest costs of study) choose the non-cooperative solution and the great majority of students choose the cooperative, lets all take it easy, solution.
5. After a worker has been at a firm a while, the employer presumably learns more about the individual's capabilities and is able to observe performance on the job. Workers assigned to the same job often produce very different levels of output (Hunter, Schmidt and Judiesch 1988). Why, one might ask, are the most productive workers (those with just the right mix of specific competencies) not given large wage increases reflecting their higher productivity? The reason appears to be that workers and employers prefer employment contracts which offer only modest adjustments of relative wages in response to perceived differences in relative productivity. There are a number of good reasons for this preference: the unreliability of the feasible measures of individual productivity (Hashimoto and Yu, 1980), risk aversion on the part of workers (Stiglitz, 1974), productivity differentials that are specific to the firm (Bishop, 1987a), the desire to encourage cooperation among coworkers (Lazear 1986) and union preferences for pay structures which limit the power of supervisors. In addition, compensation for differences in job



performance may be non-pecuniary -- praise from one's supervisor, more relaxed supervision, or a high rank in the firm's social hierarchy (R. Frank, 1984). A study of how individual wage rates varied with initial job performance found that when people hired for the same or very similar jobs are compared, someone who is 20 % more productive than average is typically paid only 1.6 % more. After a year at a firm, better producers received only a 4% higher wage at nonunion firms with about 20 employees, and they had no wage advantage at unionized establishments with more than 100 employees or at nonunion establishments with more than 400 employees (Bishop, 1987a). If relative wage rates only partially compensate the most capable workers in a job for their greater productivity, why don't they obtain promotions or switch to better paying firms? To some degree they do, particularly in managerial and professional occupations. This explains why workers who score high on tests and/or get good grades are less likely to be unemployed and more likely to be promoted, and why, many years after graduation, they eventually obtain higher wage rates (Wise 1975; Bishop 1988b). Since, however, worker productivity cannot be measured accurately and cannot be signaled reliably to other employers, this sorting process is slow and only partially effective. Consequently, when men and women under the age of 30 are studied, the wage rate effects of specific competencies may not correspond to their true effects on productivity and, therefore, direct evidence on productivity effects of specific competencies is required before conclusions may be drawn.

6. The survey was of a stratified random sample of the NFIB membership. Larger firms had a significantly higher probability of being selected for the study. The response rate to the mail survey was 20 percent and the number of usable responses was 2014.
7. EEOC regulations that evolved out of the Supreme Court's 1971 Griggs vs Duke Power decision misinterpreted Congressional intent in Title VII of the Civil Rights Act. (Gold 1985). These regulations made the use of employment selection tests measuring competence in reading and mathematics prohibitively expensive. Before such a test could be used, the firm had to conduct a very expensive validity study of the proposed test and alternative tests at their own work sites. Separate studies had to be done for men and women, blacks, hispanics and whites. Most firms did not have enough workers in each category to do a reliable study (Friedman and Williams 1982). Litigation costs and the potential liability are enormous, so companies became extremely cautious about testing. The result has been to greatly diminish the use of tests for employee selection. The Supreme Court's decision in the Wards Cove Packing Case has restored the original intent of Title VII and has shifted the burden of proof in adverse impact cases on to the plaintiff and has therefore opened the door for increased use of employment tests. It appears that employers will be able to justify the use of employment tests without having to undertake costly validity studies in their own firm by citing validity research done for similar jobs in other firms.
8. Another possible argument against policies designed to induce employers to reward high school students who study is that poor students will not be considered if an

employer learns of this fact. What those who make this argument do not realize is that the policy of providing no information to employers about performance in high school results in no recent graduates (whether good or poor student) getting a job that pays well and offers opportunities for training and promotions. In effect it is being proposed that the interests of the students who do not study and are discipline problems should take precedence over the interests of the students who lived by the schools rules and studied hard. There is nothing unfair about letting high school GPA's influence the allocation of young people to the best jobs. The GPA's are an average which reflects performance on 100's of tests, and the evaluations of over 20 teachers each of which is based on over 180 days of interaction. Selection decisions must be made somehow. If measures of performance in school are not available, the hiring selection will be determined by the chemistry of a job interview and idiosyncratic recommendations of a single previous employer. Since many employers will not request the information, providing information on student performance does not prevent the poorer student from getting a job; it only influences the quality of the job that the student is able to get.

9. A study was conducted of the cohort of High School and Beyond students projected to graduate in 1982. The dependent variables were the change between sophomore and senior years in test scores and grades. The model included extensive controls for variables that may influence both curriculum and the outcomes. Chemistry, physics, algebra II, trigonometry and calculus were selected from a more complete list of courses to represent rigorous math and science course work generally taken during or after the sophomore year in high school (Bishop 1985). The specific model estimated was:

$$Y_{it} - Y_{it-1} = BX_{it-1} + oC + OY_{j=i+1, t-1} \quad i = 1, \dots, 11$$

where

$Y_{it}$  = the "i"th outcome variable measured at the end of senior year.  
(e.g. math test score)

$Y_{it-1}$  = the sophomore year measure of the "i"th outcome variable

$Y_{j=i+1, t-1}$  = a vector of sophomore year measures of outcome variables other than the "i"th

$X_{it-1}$  = a vector of variables characterizing background and curriculum course-work variables measured in the sophomore year

$C$  = a vector of variables describing the courses taken in junior and senior year

$o$  = a vector of coefficients measuring the impact of course work on learning and career aspirations

10. This proposal sounds radical but, in fact, is only a modest change from current practice at these selective colleges. A survey of college placement officials conducted by USA Today and interviews of officials at Cornell and SUNY Binghamton conducted for this report found that students were expected to take AP courses if they are offered and grade point averages were adjusted for the difficulty level of the courses taken. High school students and parents are generally unaware of this policy, however, and many have not factored it into their high school course selections. The announcement, therefore, has two effects: it informs students and parents of existing admissions policies and warns that come 1993 those seeking admission to selective colleges will not necessarily be held harmless if a local high school does not offer AP courses. This announcement will generate strong political pressure on principals and school boards to expand their AP program and allow additional students to take AP courses. Students at schools not offering AP might be offered other ways of demonstrating college level proficiency such as an AP independent study option, taking courses during the summer at a local college or high scores on the afternoon subject matter SAT exams or New York State Regents exams. Exceptions would have to be made for students from under represented minorities, foreign students and in other individual cases but exceptions should not become the rule.
  
11. A one population standard deviation increase in test scores raises an adult's wage rate by 21 percent (Bishop 1989, p. 181, derived by taking the antilog of .19). A population standard deviation is equivalent to about 5 grade level equivalents, so the wage effect is 5.2 percent =  $(1.33/5) \times 21$  percent. The mean yearly compensation of adults 18 to 65 years old is about \$16,000 when the nonemployed are included in the denominator, so the dollar impact is  $\$830 = .052 \times \$16,000$ .
  
12. Our estimate of the productivity benefit of a 1.33 grade level equivalent increase in achievement is very conservative. College graduation raises wages of males by 50 percent or by 12.5 percent per year of college. If one were to assume, instead that 13 months of additional time in elementary and secondary school is equivalent to a year in college, the estimated productivity benefit triples to 12.5 percent. In addition the social costs of adding 20 days to the school calendar are probably smaller than \$15 billion, for child care costs will be substantially reduced. Yes, 16-18 year olds will be earning less during the summer but this effect is substantially smaller than the savings in child care costs. It should be noted that student leisure time is significantly reduced and that except for the lost work time of teenagers this is not counted as a cost. This is standard operating procedure when doing benefit cost studies of educational interventions.
  
13. The present value of the benefits in year 0 of \$4.62 billion a year starting in year 13 and running to year 60 or  $\$4.62(25)(.853)(.588) = \$57.94$  billion. The present value of costs are  $(\$15/13)25(1-.588) = \$11.88$  billion.

14. In order for a program to be considered educational it would have to be under the creative control of a subject matter expert (e.g., Jacob Bronowski, Carl Sagan), an educational institution or a committee of educators and subject matter experts. Each network and independent station would have its own educational advisory committee but the decision making power would remain with the network/station. To minimize the politics, appointments to these committees would be for a fixed non-renewable term and the power to appoint would be dispersed among a variety of elected officials and educational organizations. For example, in states which elect a state educational commissioner, the official might make one appointment to the advisory committees for each station located in the state. The board of education for the largest city included in a station's viewing area might also be asked to appoint one member. The teachers association representing most of the teachers in the viewing area might be allowed to elect still another.
15. The Commission on Workforce Quality and Labor Market Efficiency included in its membership Constance E. Clayton, Superintendent of Schools of Philadelphia, Jose I. Lozano, Publisher of La Opinion, William J. Wilson, author of The Truly Disadvantaged. The Commission on the Skills of the American Workforce included in its membership Eleanor Holmes Norton, former Chairwoman of the Equal Employment Opportunity Commission, John E. Jacob, President of the National Urban League, Badi Foster, President of Aetna Institute for Corporate Education, Thomas Gonzales, Chancellor of Seattle Community College District VI, Anthony J. Trujillo, Superintendent of Sweetwater Union High School District.